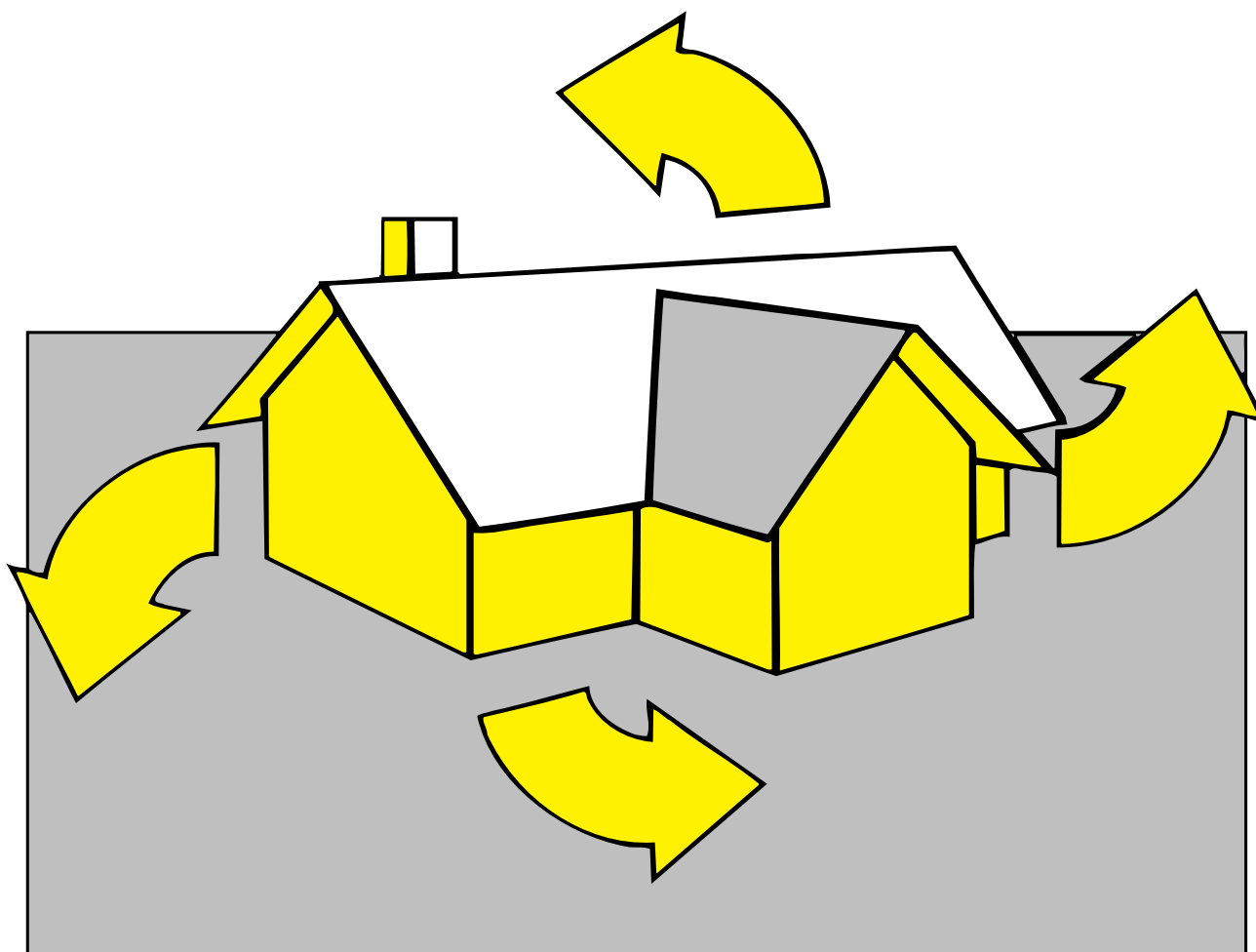

Lessons in Solid Waste Management

For Teachers Grades K-3
A School Enrichment Program



Household Hazardous Waste

Kansas State University
Agricultural Experiment Station and
Cooperative Extension Service

Financial Assistance for Production Provided by
Coastal Refining and Marketing, Inc.

Financial Assistance for Printing Provided by
Kansas Department of Health and Environment

Contents: K–3

	Teacher Introductory	3
1	Definition/Identification Signal Words	19
2	Storage and Use Safety, the Housekeeper	21
3	Health Concerns Routes of Exposure	27
4	Disposal Household Connections	31
5	Reduction Is There a Safer Alternative?	35
6	Ecology More Than Meets the Eye	37
	Glossary	41
	Resources	45
	Kansas Contacts	49

What is a Household Hazardous Product?

A household hazardous product is one whose use, storage, or disposal poses a threat to human health or the environment. Products are considered hazardous if they have one or more of the following properties:

- **Flammable:** Can be easily set on fire or ignited. Examples include gasoline, paint strippers and nail polish removers.
- **Reactive:** Can detonate or explode through exposure to heat, sudden shock, pressure or incompatible substances. Examples include certain swimming pool chemicals and some drain cleaners.
- **Corrosive:** Can burn and destroy living tissues when brought in contact. Examples include oven cleaners, auto batteries and some spot removers.
- **Toxic:** Capable of causing injury or death through ingestion, inhalation, or absorption. Examples include pesticides, furniture polishes and antifreeze.

Thousands of consumer products are hazardous; but for ease of remembering, they can be broken into the following general categories:

Category	Examples of Household Hazardous Products
Automotive products	gasoline, motor oil, antifreeze, windshield wiper fluid, car wax and cleaners, lead-acid batteries, brake fluid, transmission fluid
Home improvement	paint, varnish, stain, paint thinner, paint stripper, caulk, products adhesives
Pesticides	insecticides and insect repellant, weed killers, rat and mouse poison, pet sprays and dips, flea collars, mothballs, disinfectants, wood preservatives
Household cleaners	furniture polish and wax, drain openers, oven cleaners, tub and tile cleaners, toilet bowl cleaners, spot removers, bleach, ammonia
Miscellaneous	household batteries, cosmetics, pool chemicals, shoe polish, lighter fluid, prescription medicines, arts and crafts materials

Product Labeling

You can tell whether a product is hazardous by reading the label. There are two specific sets of federal regulations for labeling hazardous products: hazardous products other than pesticides, which can be toxic, corrosive, flammable, or reactive, are regulated by the Consumer Product Safety Commission; and products containing pesticides, which are designed to be toxic, are regulated by the Environmental Protection Agency.

When reading the product label, look for the signal word and principal hazard information. The labels on both non-pesticide hazardous products and pesticides must contain the appropriate signal word depending on the hazard associated with each product. See Table 1 for information on signal words and other label requirements.

Table 1**Nonpesticide Product Label Requirements****Signal Words:**

danger—means the product is extremely flammable, extremely corrosive, or highly toxic

poison—means the product is highly toxic

warning or caution—means the product is less toxic

Must contain statement “Keep out of reach of children” or its practical equivalent.

Must contain description of the principal hazards involved in using the product. Words used to describe these hazards include *Flammable, Corrosive, Vapor Harmful, Harmful if Absorbed Through Skin*.

Pesticide Product Label Requirements**Signal Words:**

danger or poison—means the product is highly toxic

warning— means the product is moderately toxic

caution—means the product is slightly toxic

Must contain statement “Keep out of reach of children” on the front label.

Must contain information on any fire, explosion, or chemical hazards the pesticide poses.

Must contain information on how to avoid the hazards the product poses.

Unfortunately for the consumer, labels often serve more as a product advertisement than as a source of information for product safety. The brand name and effectiveness of the product are often the most visible words on the label. It is necessary to read the small print and all wording on the label to find clues and information which can guide you in determining product safety.

Hazardous Products and the Human Body

The image many people have of the health threat from hazardous products involves a child becoming sick from swallowing a cleaning product stored under the sink. However, we can all be exposed to hazardous products through a variety of activities. Many of us do not recognize our bodies' responses to hazardous product exposure.

How Do Hazardous Substances Enter Our Bodies?

Hazardous substances may enter our bodies through one or more of these routes:

- Ingestion—eating or drinking hazardous substances or contaminated food and water.
- Inhalation—breathing in hazardous gases, vapors, fumes, dusts and sprays.
- Skin absorption—hazardous products containing corrosives or irritants can injure the skin and may be slowly absorbed into the body tissues and bloodstream. Some hazardous substances (such as organic solvents) can be absorbed through skin contact without damaging the skin and without your being aware of it. Many hazardous products may cause eye damage if splashed into the eye. Eyes are particularly vulnerable to injury from hazardous substances.

Types of Health Effects

Acute health effects are signs and symptoms that result from a single exposure, such as headaches, dizziness, skin or eye irritation, vomiting, coma, or death. Symptoms usually occur shortly after exposure and may range from minor to severe.

Chronic health effects are gradual and occur through repeated exposure over an extended period of time, such as cancer, liver or kidney damage, birth defects, or central nervous system damage.

There is generally more information available on the acute effects of hazardous ingredients than chronic effects because it is much easier to quantify short-term effects. Isolating the long-term effects of a single ingredient is difficult because individuals are exposed to hazardous substances from a variety of sources; there may be a lapse in time between exposure and the development of symptoms; and symptoms may vary from one individual to another.

How Do Our Bodies Respond to Hazardous Substances?

Skin and Eyes: The physical effects of skin contact include skin reddening, blistering, itching and thickening. If hazardous substances enter the eye, they may cause tearing, irritation of the cornea, inflammation and blindness.

Respiratory System: The respiratory system has a variety of responses, such as coughing, to inhaled hazardous substances. But these responses are not effective against solvent vapors, irritating gases, and other nondust hazardous substances. These substances may damage the lungs. Gases or solvent vapors can dissolve into lung tissue and damage it and/or enter the circulatory system.

Digestive System: If corrosive substances are ingested, they may damage the mouth, esophagus and stomach. Other hazardous substances may be transported across the intestine into capillaries and then throughout the circulatory system. The blood from the stomach and intestines reaches the liver before reaching other body organs and so the liver may be damaged.

Liver and Urinary System: The liver and the kidneys are organs of detoxification and excretion of metabolic wastes. Organ damage can result when the capacity to detoxify is exceeded.

Circulatory System: This system can transport hazardous substances that the body has been exposed to. However, the blood, blood vessels and heart may be damaged.

Nervous System: Most organic solvents cause depression of the central nervous system. Symptoms from over-exposure include feeling high, fatigue, dizziness, lack of coordination, confusion, sleepiness and nausea. Very high levels may result in coma or death.

Reproductive System: Some hazardous substances can effect reproduction resulting in reduced fertility in both men and women, genetic damage, and lowered sexual function. Hazardous substances that cause genetic damage are called mutagens. Hazardous substances that can pass through the placenta and effect the developing fetus are called teratogens. These include many metals (lead, mercury, copper and cadmium) and organic solvents.

What is the Risk From Exposure?

People vary in their susceptibility and response to exposures to hazardous substances. There are those individuals who begin smoking cigarettes at age 10 and live to a ripe, old age, while others who smoke develop lung cancer at a very young age. The effects of exposure to a hazardous substance depend upon individual characteristics, such as heredity, overall health, height, weight, gender, amount of exposure and age.

Children are of Special Concern

Children are of special concern since they have specific traits that make them more prone to harm from exposure to hazardous products than adults. These traits include:

- Higher metabolism, so they absorb more toxic substances;
- Faster breathing rates, so they inhale more toxins relative to body size;
- Lower body weights, so they have more toxins per pound of body; and
- Developing immune systems, organ systems, and brain and nervous systems, which are more prone to damage.

Children also have frequent contact with their environment by playing in the dirt, in the water, and on floors and carpets. As a result, they have more opportunities to be exposed to toxins in the environment. In addition, children often have cuts and abrasions which makes skin absorption more likely.

Hazardous Products and the Environment

How hazardous substances move through the environment and where they end up is determined by such factors as the physical state of the material and the method of transport. For instance, volatile materials may contaminate the air, while water soluble materials may be transported by water. Another factor is whether or not the substance is a persistent material. Persistent materials take a long time to break down, if ever.

Persistent materials can concentrate through the food chain in a process called bioaccumulation. A number of smaller organisms that are contaminated are eaten by larger ones. The larger ones are eaten by a larger one, etc. The further along the food chain, the greater the concentration. Humans are one of the top predators of these systems and so can accumulate a large amount of toxins. A chemical that shows no effect in a small concentration could be very injurious or fatal when concentrated in the predator. In some states, chlordane used for termite control has washed from homes and yards into the rivers and required a fish consumption warning in some rivers.

Routes Into the Environment

Household hazardous wastes enter the environment through a number of routes. Here is what can happen for different methods of household hazardous waste disposal.

IN THE TRASH

In many areas garbage is picked up at the curb and taken to a transfer station, where it is compacted. From there it is hauled to the landfill. The trash is dumped into the section of the landfill currently being used and further compacted by heavy equipment. This can result in containers breaking open and spilling their contents. Liquids put in the landfill combine with rainwater and soak through the garbage. Soluble hazardous materials may be washed with them, producing leachate. Leachate will flow downhill over surface land, or will percolate through the soil until it reaches an impermeable layer. Leachate can contaminate groundwater and surface water. According to federal regulations, new municipal landfills must have a protective lining, leachate collection system and groundwater monitoring system. But many landfills designed before the standards were established are contaminating the environment.

DOWN THE DRAIN

Twenty percent of household hazardous wastes goes down the drain or gets flushed down the toilet. From there it goes either into the municipal wastewater treatment system or into a septic system.

- Into the Wastewater Treatment System

The wastewater system is a network of underground pipes that collects liquid waste from each building in town and brings it together in huge pipes called trunk lines. Not long ago, sewage used to be dumped directly into rivers, lakes and oceans. Now, most cities and towns have a municipal wastewater treatment plant that cleans up sewage before it is pumped into rivers, lakes and oceans.

At the treatment plant, sewage is treated with chlorine to kill any disease-causing organisms. Much of the solid material and some of the pesticides, polychlorinated biphenyls (PCBs), and heavy metals are removed by allowing them to settle out in a residue called sludge. Common heavy metals in sewage are lead, zinc, mercury, and cadmium. Sources of these heavy metals include household batteries, cleaners and paints. Exposure to heavy metals, in greater than small concentrations, can be harmful to human health and the environment. Sludge is often applied to farm land as fertilizer. Persistent chemicals and heavy metals in the sludge can then begin to move through the environment.

In addition, hazardous substances poured down the drain or flushed down the toilet can damage pipes and trunklines, or the treatment plant. Workers can suffer injuries as well when flammable materials or hazardous vapors reach the treatment plant.

- Into the Septic System

Many homes in the United States are connected to a septic system, instead of a wastewater treatment plant, especially in rural areas and small communities. In a septic system, bacteria break down much of the waste. However, if hazardous wastes are dumped into the septic system, they can kill the helpful bacteria and contaminate the septic tank sludge or the drain field soil. The sludge, pumped every few years from the tank, is disposed of either at a wastewater treatment plant, a lagoon, or a sludge landfill. If a tank is not pumped out periodically, the bacteria will die, allowing harmful substances into the groundwater or causing the drainfield to become blocked, backing up the system.

INTO THE STORM DRAIN

Storm drains are commonly misused for the disposal of paint, motor oil, antifreeze, pesticides, and other wastes. Unfortunately, storm drains do not purify and remove pollutants. In many communities, storm-water runoff is discharged directly into nearby streams, rivers, lakes, or even sinkholes, which are conduits to groundwater. In other communities, storm drains empty into the wastewater treatment plant where pollutants adversely affect the quality of the treated water and the sludge.

BURNING TRASH

If you burn household hazardous waste, what happens? This depends on the type of material in the waste being burned. A pressurized aerosol can could explode, burning paint or batteries could leave a residue of heavy metals, burning solvents might vaporize the liquid into the air, and burning plastics can release poisonous fumes or release toxic compounds into the atmosphere which last a long time. In addition, burning trash does not completely consume the wastes because of the low temperatures from these fires. Particles are released which can carry hazardous substances. These particles may be breathed in by humans, animals, and plants, and can contaminate soil and water.

DUMPING WASTES ON THE GROUND

If household hazardous waste is dumped on the ground or in a ditch, where does it go? Rainwater can carry the wastes over land, along ditches, to a waterway or into the groundwater. Water drains or soaks into the ground until it hits an impermeable layer, such as clay. The water then collects in the spaces between sand, gravel, or rock particles. Underground areas where groundwater collects are called aquifers. Some aquifers replenish lakes or streams. Wells that serve a large percentage of people in this country with drinking water are drilled into aquifers. Thus, as a result of hazardous waste runoff and improper disposal, drinking water supplies can become contaminated.

How is Household Hazardous Waste Managed?

Many people understand that household hazardous waste should not be thrown away. The best disposal option for unwanted, but usable household hazardous products is to use them up or find someone who can. If the products are no longer usable, but can be recycled, they should be taken to a recycling outlet. If these options are not possible, the products should be saved for a household hazardous waste collection program. There have been over 4,500 collection programs in the United States since the first one was held in 1980. When a community holds a household hazardous waste collection, people are encouraged to bring unwanted and unusable household chemicals to a designated location. There, trained workers remove the products from the vehicles, sort them into types of waste, pack them in drums, and then dispose of the wastes, usually to a special hazardous waste incinerator or landfill. The average amount of waste brought into a collection program is 100 pounds per household.

Types of Collections

There are several types of household hazardous waste collections. The type of collection a community chooses often depends upon the availability of funds and whether its citizens live in a rural or urban setting.

ONE-DAY COLLECTIONS

One-day collections allow householders to bring their household hazardous waste to a designated location on a specified date. Wastes that are brought in are recycled if possible, and the rest are immediately packaged and sent to a hazardous waste treatment or disposal facility.

PERMANENT COLLECTIONS

Permanent collection facilities are designed to store household hazardous wastes for short periods of time. At a permanent collection facility, householders bring their hazardous waste by appointment or during open hours.

DOOR-TO-DOOR COLLECTIONS

Some communities provide door-to-door collections where trained staff pick up materials in a retrofitted truck and sort, package, and store at a main facility until enough waste is collected to warrant disposing of it. Door-to-door is particularly helpful to elderly and/or disabled people. In most areas this collection is done by appointment. This is a very expensive service and typically is provided in conjunction with other collection events.

CURBSIDE COLLECTIONS

Some communities provide a curbside collection program where yellow boxes are set out at the curb for pickup of household hazardous wastes. Typically, only certain wastes are accepted, such as waste oil, household batteries or auto batteries.

MOBILE COLLECTIONS

Mobile sites stay in one location for a specific period and then move the whole operation to the next site in within the service area. Collection sites can be at malls, fire stations, church lots, store parking lots, etc. At the end of the collection period at the site, the waste is placed on a truck and transported back to the main facility; or if the truck is not full, it moves on to the next site.

What Happens to Materials Collected at a Household Hazardous Waste Collection?

The ultimate destination of household hazardous wastes depends upon the individual characteristics of each waste. For example, used motor oil and antifreeze can be recycled; some acids and bases can be neutralized; and some flammable or combustible liquids can be fuel blended and burned. Other wastes must be packaged and sent to a hazardous waste facility.

Household hazardous waste collections are good because they rid homes of stores of old products and help to educate and safeguard the community. But they are also very expensive and the hazardous waste landfills or incinerators do not operate without their own environmental costs. Thus, it is vital that we take steps to reduce the amount of household hazardous waste we generate.

Reducing Risks and Minimizing Wastes

There are a variety of actions each of us can take to reduce risks from household hazardous products and to minimize household hazardous wastes.

Before You Buy a Product

- Read labels carefully. Avoid buying products with labels containing the words: caustic, corrosive, danger, explosive, flammable, poison, toxic, volatile, or warning.
- Use safer products whenever possible. Safer alternative products can be found in stores. Recipes for cleaning products using common kitchen ingredients, such as baking soda and vinegar, can be found in books available through most libraries. (See Resources.)
- Buy the least hazardous product. Let the signal words serve as a guide.
- Buy household hazardous products only in the amount you need for the task at hand.
- Buy hazardous products in childproof packaging.
- Check to see if safety equipment is required when using this product. Make sure you have the proper equipment on hand or that you purchase it for use with the product.
- Avoid aerosol products. Aerosol cans disperse the product in tiny droplets that can be deeply inhaled into the lungs and quickly absorbed into the bloodstream. In addition, aerosols ignite easily and may explode when subjected to high temperature or pressure.

Use it Safely

- Read all labels before using hazardous products, paying careful attention to proper use instructions and dangers.
- Do not mix products unless instructed by label directions. Mixing products can cause explosive or poisonous chemical reactions. Even different brands of the same product may contain incompatible ingredients which may react when mixed together.
- During use, keep hazardous products out of the reach of small children. If the phone rings or you are called out of the room, close the product and take it with you or take the child with you. Do not leave products unattended or unsealed.

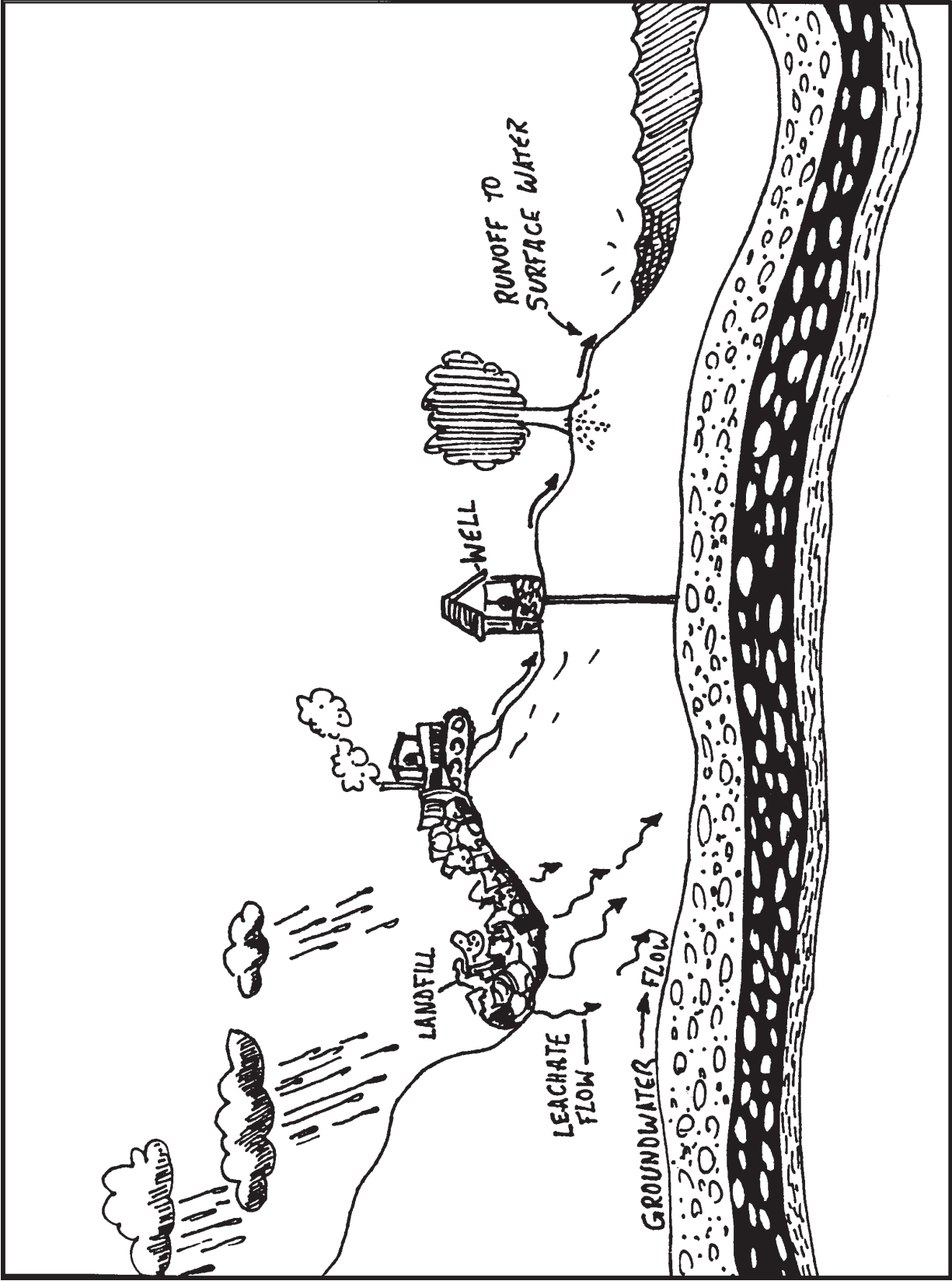
- Avoid wearing soft contact lenses when working with solvents and pesticides. They can absorb vapors from the air and hold the chemical against your eyes.
- Do not eat, drink, or smoke while using hazardous products. Traces of hazardous substances can be carried from hand to mouth. Smoking can start a fire if the product is flammable.
- Use products in well-ventilated areas to avoid inhaling vapors. Try to keep lids closed as much as possible while working with hazardous products to minimize the vapors. Work outdoors whenever possible. When working indoors, open windows and use an exhaust fan. Position the fan to draw air away from the work area to the outdoors, rather than recirculating it indoors. Take plenty of fresh air breaks. If you feel dizzy or nauseous, tightly seal the product, go outside, and take a break.
- Use protective gloves, goggles, and respirators that are appropriate to the task if the product presents hazards to skin, eyes, or lungs.
- Clean up after using hazardous products. Carefully seal products and properly refasten all caps.

Store it Safely

- Keep products out of the reach of children and animals. Store all hazardous products in locked cabinets, in cabinets with childproof latches, or in other secure structures.
- Make sure lids and caps are tightly sealed and childproof.
- Make certain all products are clearly labeled before storing them.
- Leave products in their original containers with the contents clearly identified on the labels. Never put hazardous products in food or beverage containers.
- Keep products away from sources of heat, spark, flame, or ignition. These sources include pilot lights, switches and motors. This is especially important with flammable products and aerosols.
- Store products containing volatile ingredients, or those that warn of vapors or fumes, in a well-ventilated area.
- Store gasoline in safety-approved containers only in a well-ventilated area away from all sources of heat, spark, flame or ignition.
- Know where flammable materials are located in your home and how to extinguish them. Keep a working ABC-rated, or Multi-Purpose Dry Chemical, fire extinguisher in your home.
- Keep containers dry to prevent corrosion. If a product container is beginning to corrode, place the entire container in a plastic bucket with a tight-fitting lid and pack non-flammable absorbent, such as cat box filler, around the container. Clearly label the bucket with its contents and appropriate warnings.

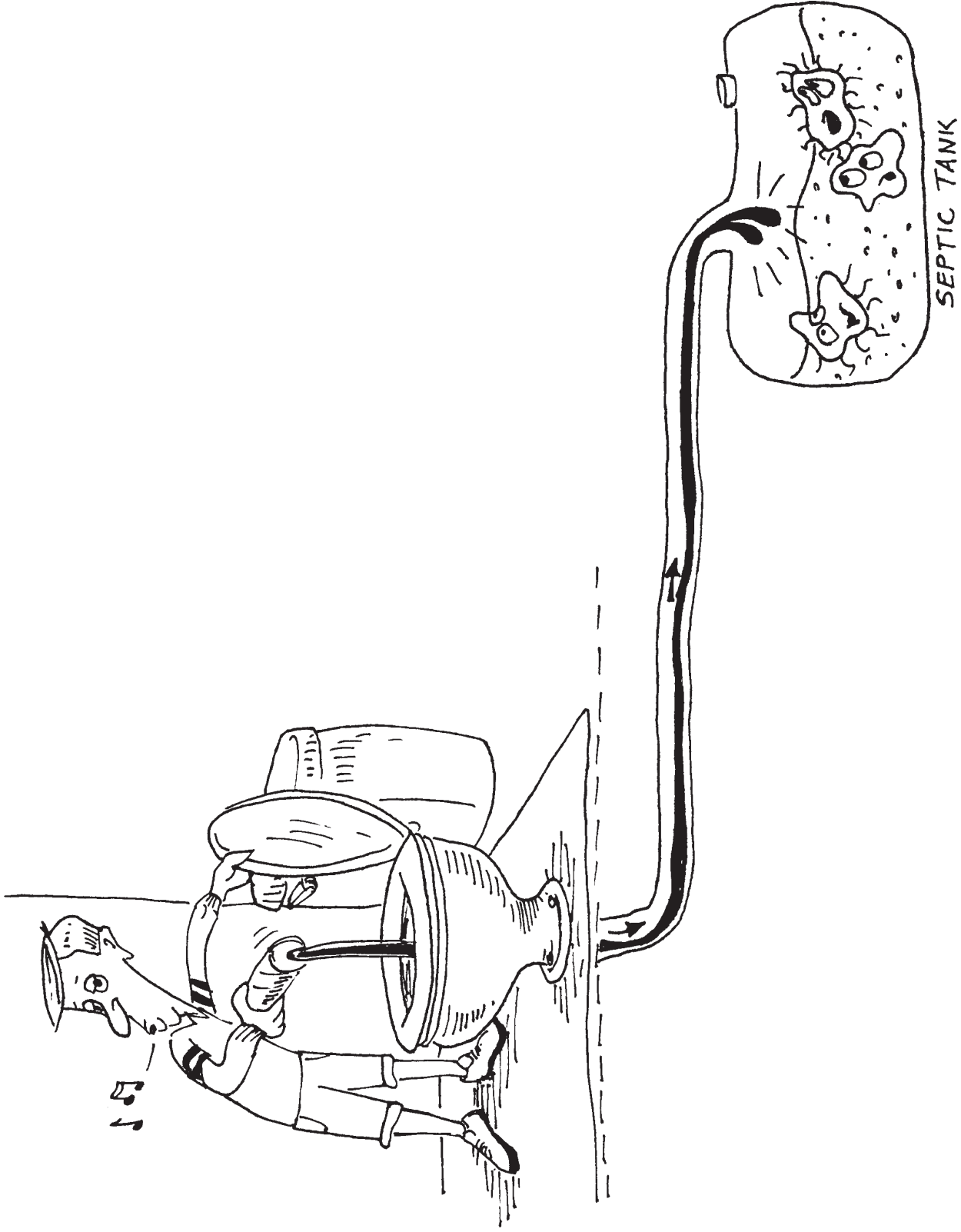
Dispose of it Safely

In most cases, the best thing to do with a leftover product is to use it all according to the label directions or find someone that will use it. Banned or restricted pesticides, old medicines, and products whose safety instructions are no longer readable should not be used or shared. Some household hazardous wastes, including lead-acid batteries, button batteries, used motor oil, and antifreeze can be recycled. For many household hazardous products there may be no safe disposal available. These products must be stored safely until your community holds a household hazardous waste collection.



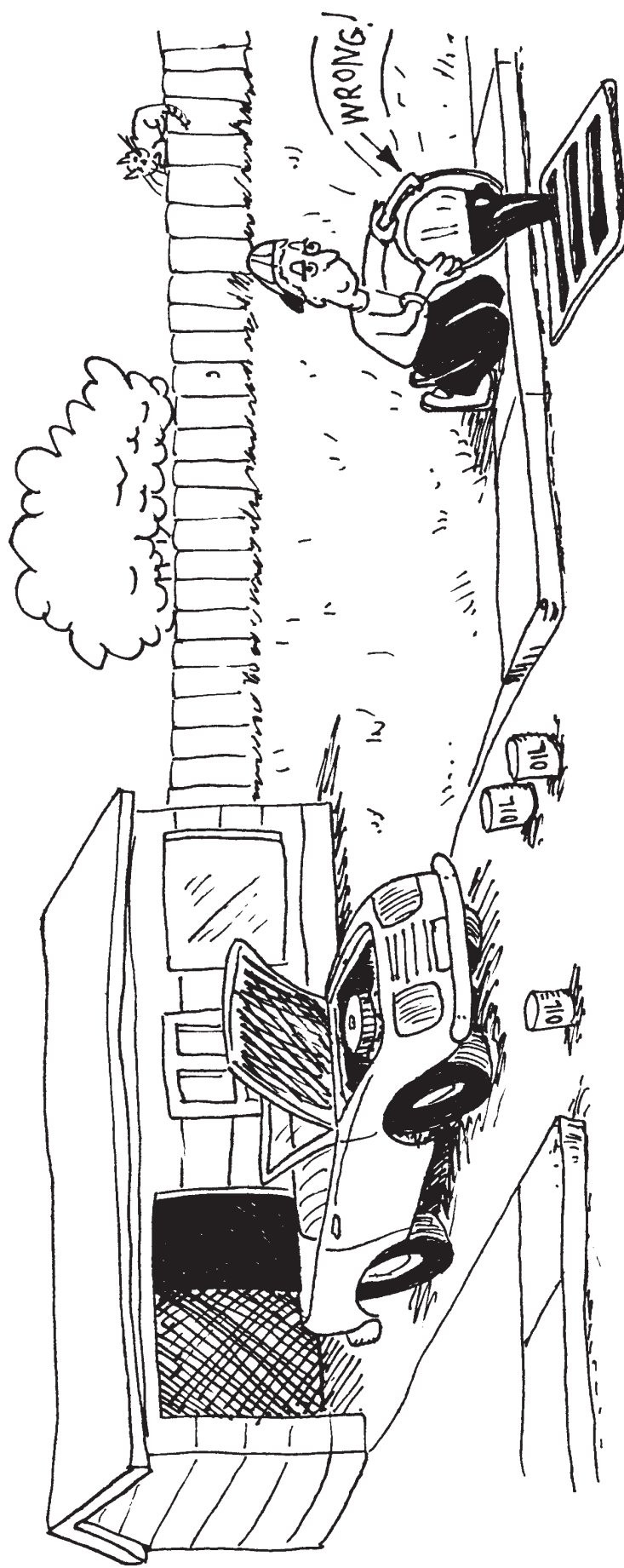
In the Trash

From A-Way With Waste



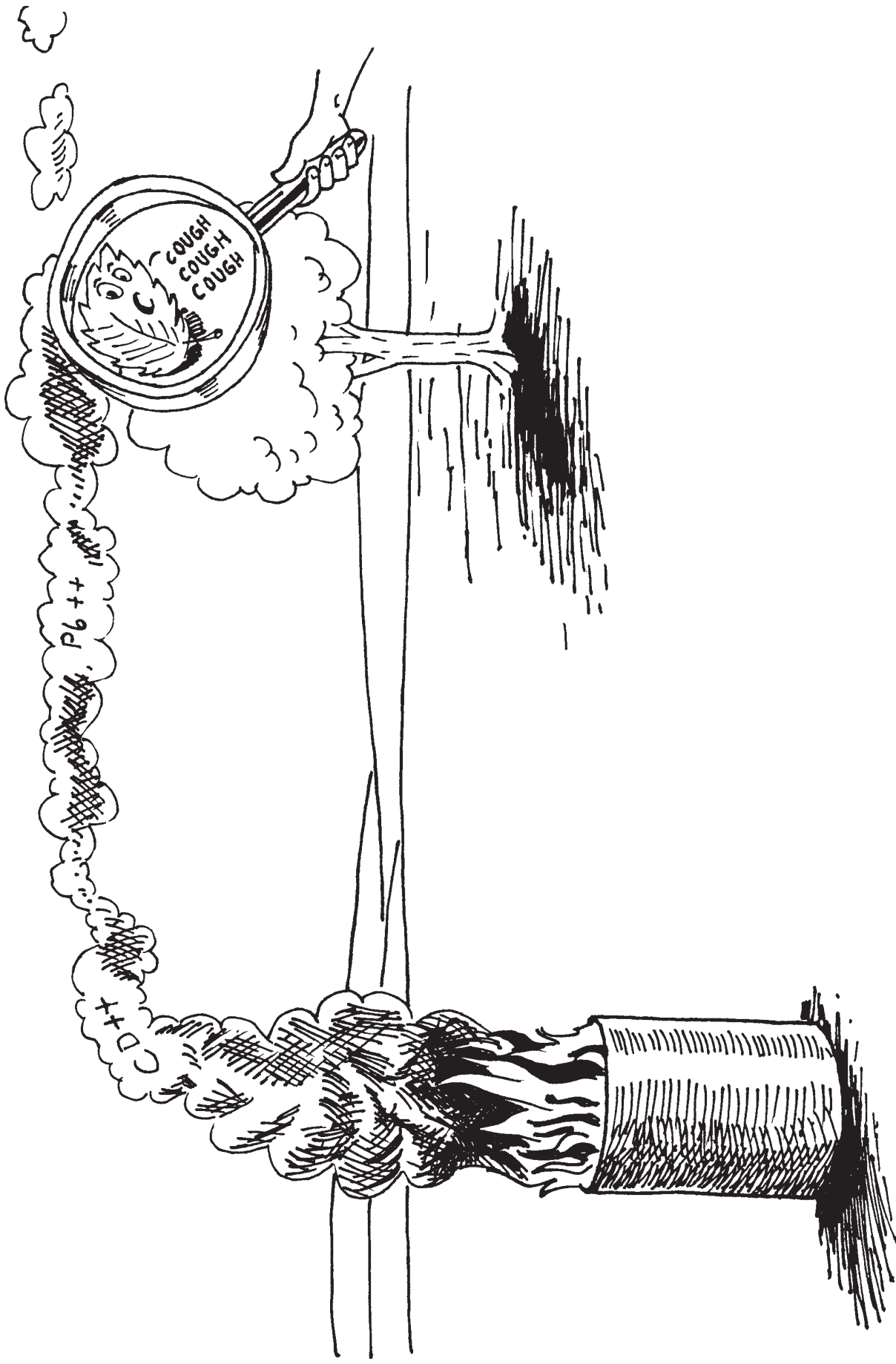
Into the Septic System

From A-Way With Waste



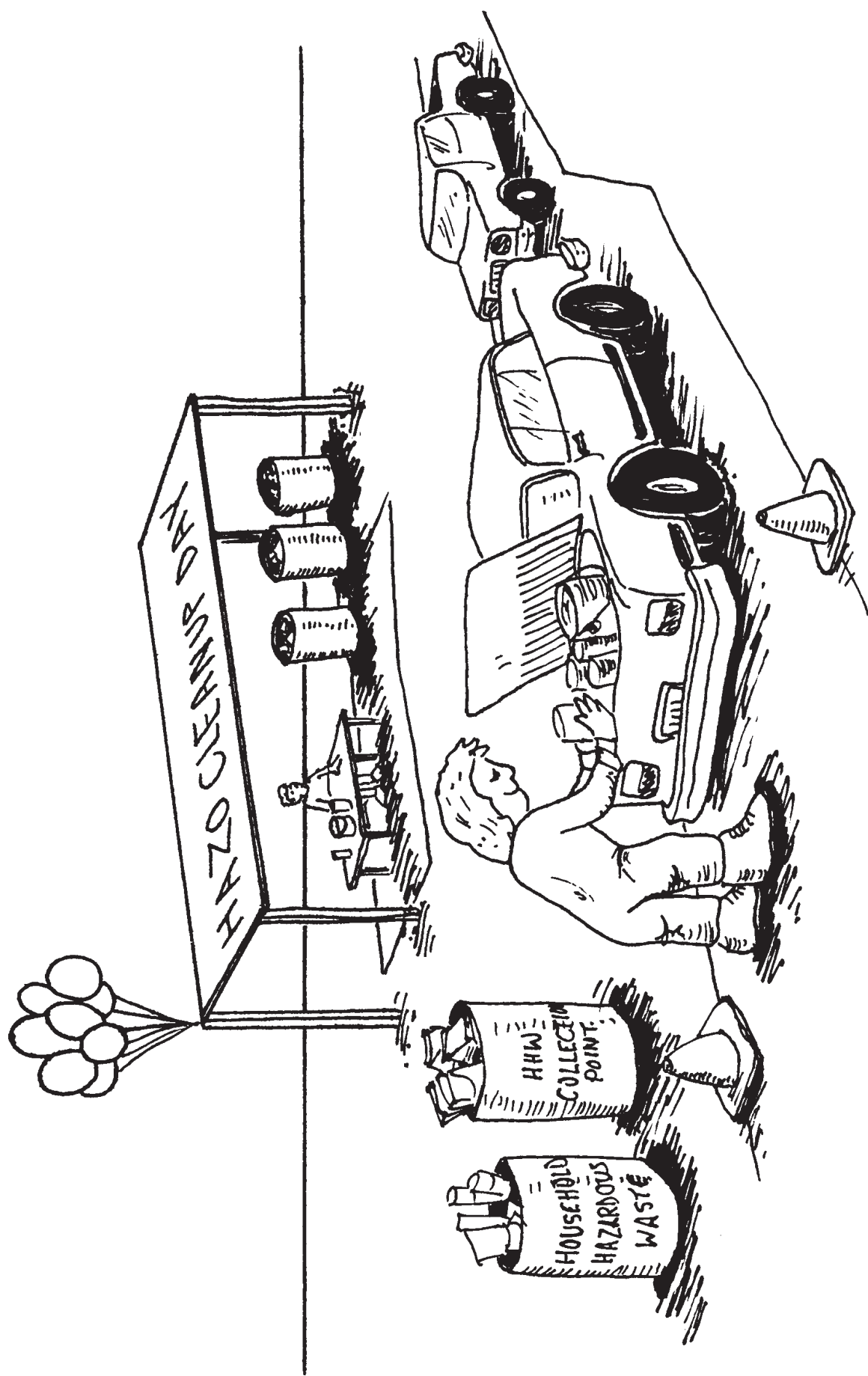
Into the Storm Drain

From A-Way With Waste



Burning Trash

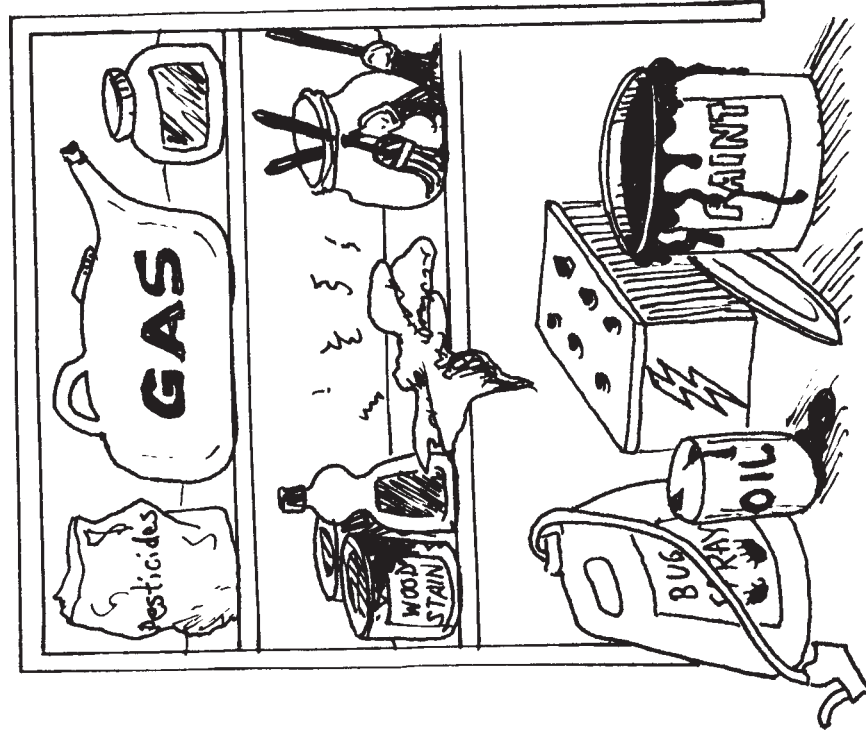
From A-Way With Waste



One-Day Collections

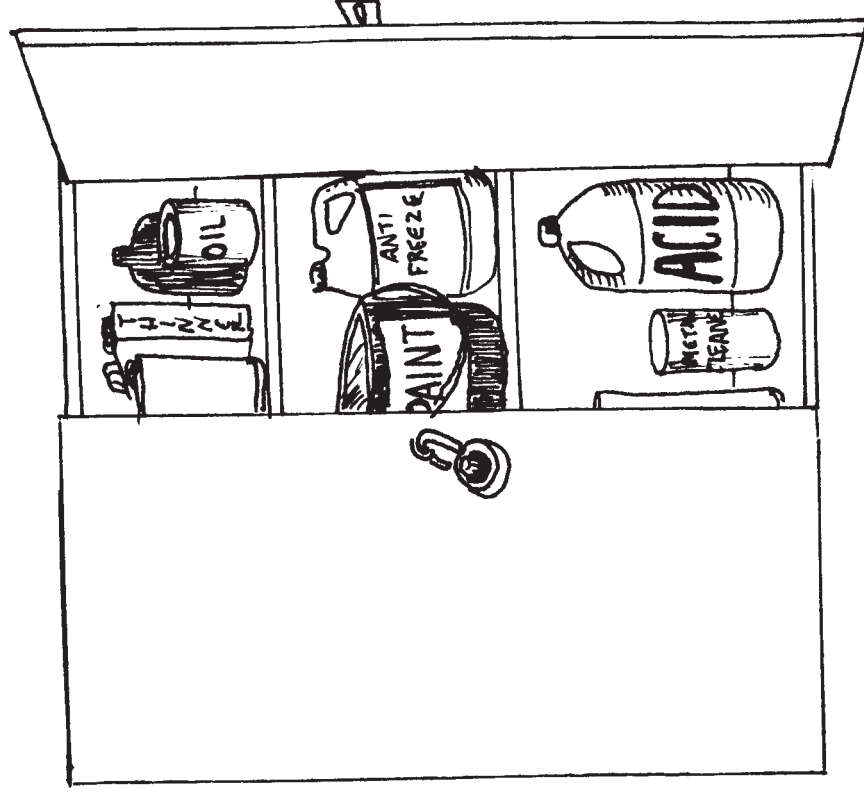
From A-Way With Waste

Store hazardous products in their original containers with lids and caps tightly sealed. Keep them in a locked cabinet, out of the reach of children and animals.



Unsafe

Store it Safely



Safe

From Household Hazardous Waste Project

Sample Letter to Parents

Before beginning this unit, it is strongly recommended that a letter be sent to parents informing them that their children will be learning about household hazardous products.

Dear Parent(s):

This week we are learning about products used in and around the home that are potentially dangerous.

Each year, poison control centers receive numerous calls concerning exposure to household hazardous products such as adhesives, arts and crafts materials, automotive fluids, cleaning substances, moth repellents, paints and pesticides. Many of these calls concern children who accidentally swallow a hazardous product because it is within their reach, has an attractive color or is in a familiar container.

It is our responsibility to make sure that children, as well as pets, are not exposed to household hazardous products. Such products can be found in the kitchen, bathroom, laundry room, garage—virtually every room in the house. The following list is provided to assist you in “poison proofing” your home. Although the list is not complete, it will provide you with an idea of what should be considered dangerous to young children.

To safely store hazardous products, these products should be placed in areas not accessible to children. Store products in locked cabinets, in cabinets with child-proof latches, or in other secure structures. Always keep products in their original containers. If available, buy hazardous products in child-proof packaging. Avoid buying hazardous products whenever possible.

In addition, never leave hazardous products out in the open and unattended. Many poisonings occur while the product is in use. You may want to contact your Poison Control Center to request telephone stickers to post on your phones in case of an emergency. In Kansas, that phone number is: 800-332-6633. In Missouri: 800-366-8888.

Thank you very much.

Poison Proofing Your Home—What to Look For

Bathroom:	bubble bath, disinfectants, medicines, personal hygiene products, toilet bowl cleaner
Bedroom:	cosmetics, moth balls, nail polish/remover, perfumes
Garage:	antifreeze, gasoline, kerosene, motor oil, paints and thinners, pesticides, pool chemicals
Kitchen:	air fresheners, bleach, cleaners, drain opener, floor wax, furniture polish, oven cleaner
Laundry:	bleach, detergents, fabric softener, spot removers

Notes:

Signal Words

Rationale

Some of the most common and frequently used household products contain hazardous ingredients. Understanding the dangers of these products begins with knowing how to identify which products are hazardous.

Learning Outcome

Students identify household hazardous products by examining product labels and recognizing signal words and visual symbols.

Teacher Background

See Teacher Introductory, pages 3 to 4. Labels of hazardous products are required by federal law to list signal words. DANGER or POISON indicate that the product is highly toxic, corrosive, or extremely flammable. WARNING or CAUTION indicate that the product is moderately or slightly toxic.

Materials

- Several small empty containers
- Several containers of colored water
- Measuring spoons
- Picture of a skull and crossbones poison symbol
- Poster with song lyrics

Learning Procedure

1. Explain to students that there are products we use at home that may contain ingredients that could be dangerous (hazardous) to our health and the environment.
2. Explain to students that there are signal words that identify products as hazardous. Write the signal words on the board: CAUTION, WARNING, DANGER and POISON. Show a picture of a skull and crossbones poison symbol. Tell students that other words that may appear on hazardous product labels include: toxic, flammable, reactive, explosive, and corrosive.
3. Divide the class into small groups and have each group conduct the following measuring activity to visually demonstrate the difference between the signal words. (You may want to perform this activity as a demonstration for younger grades.)
4. Give each group three containers labeled CAUTION, WARNING and DANGER/POISON, measuring spoons, and a container filled with colored liquid. Assign students to do the following:
 - Measure 2 tablespoons of a colored liquid and pour into the CAUTION container.
 - Measure 1 teaspoon of colored liquid and pour into the WARNING container.
 - Measure one drop of colored liquid and “drop” into the DANGER/ POISON container.

5. Have students pretend the liquid in each of the three containers is hazardous. According to labeling requirements, extremely hazardous substances must be labeled with the signal words DANGER/POISON. Moderately hazardous substances must bear the signal word WARNING, and slightly hazardous substances must list the signal word CAUTION. **Ask:** Which of the three containers is the most hazardous? Is there a big difference between the amounts of liquid in the different containers? Tell students that the amount of liquid in each container could seriously hurt someone if the liquid was a hazardous substance. **Ask:** Do you think hazardous products affect you the same way they do an adult? How are you different? Would it take more or less of a hazardous product to make a child sick?
6. Sing the song “Be Aware of Toxics in the Home.”

“Be Aware of Toxics in the Home”

(Sung to the tune of “When Johnny Comes Marching Home”)

There are many different products in our homes, our homes.

Some are safe and others are unknown, unknown.

Look at the label and take care,

Household dangers—BE AWARE!

And we'll be safe when we know the toxics in our homes.

Product labels have a message to share, to share.

Look for certain words and then take care, take care.

CAUTION, DANGER, WARNING TOO

These are words to listen to,

And we'll be safe when we know the toxics in our homes.

The signal words may not be on the label alone, alone.

The label might have a skull and a crossbone, crossbone.

CAUTION, DANGER, WARNING, TOO

These are words to listen to,

And we'll be safe when we know the toxics in our homes.

Questions

- What are signal words?
- What should we do if we see a product with a signal word on it?

Extended Learning

1. As a class, or in small groups, create another verse to the song which describes what students should do if they see a product with the words CAUTION, WARNING or DANGER or any poison pictures on the label. Sing the entire song with the new ending.
2. Show students several examples of hazardous product labels. Have students find the signal words on the labels.

Source

Adapted from *Teaching Toxics*

Safety, the Housekeeper

Rationale

Many common household products are hazardous. The risk of accidental poisonings can be reduced by safely storing and using these hazardous products.

Learning Outcome

Students identify what types of products are hazardous and the characteristics that make them hazardous. Students describe where these products are commonly found in the home and how they should be safely stored.

Teacher Background

See Teacher Introductory, pages 9 to 10. Many preventable accidents, injuries, illnesses and fires occur in homes due to unsafe storage of hazardous products. A product is considered hazardous if it has one or more of the following properties: toxic, corrosive, flammable, or reactive. Thousands of consumer products are hazardous; but for ease of remembering, they can be broken down into the following categories: automotive products, home improvement products, pesticides, household cleaners and miscellaneous.

Materials

- Magazine pictures or newspaper ads of household hazardous products
- Magazine pictures or newspaper ads of food items
- Water soluble pen
- Overhead projector
- Overhead of *Safety's House*
- Copies of *Products* sheet
- Copies of *Shelves/Cabinet* sheet

Learning Procedure

1. Hang up magazine pictures of household products in front of the classroom.
2. Tell students that there are things found in the home that are safe to eat and some things that are not safe to eat. Many things that are not safe to eat can make us very sick and are called poisons. Tell students that there are some products used in the home that may be hazardous if not handled and disposed of carefully. Explain that hazardous means dangerous and that hazardous substances are likely to cause harm to humans or to the environment because they are either toxic (poisonous), flammable (can be easily set on fire), reactive (can detonate or explode through exposure to heat, sudden shock, pressure or incompatible substances), or corrosive (substances that rapidly eat into or dissolve away what they touch).
3. Have the students look at the pictures that are hanging up in front of the classroom. **Ask:** What products would you eat and which wouldn't you eat? Allow five minutes for discussion. Encourage students to expand on their reasons, such as "That's medicine and we should only eat what our parents give us to make us feel better." Emphasize the importance of not touching hazardous products.

4. Tell students that they are going to be hearing a story about Safety, the Housekeeper, and that they will be taking a tour of Safety's house. Explain that Safety lives in the house with a little boy and girl. As Safety was cleaning the house one day, he noticed that someone left some things out that could hurt children if they ate them. So Safety decided to go through the whole house to pick up harmful products and put them in locked cabinets where children could not reach them and harm themselves.
5. Show the overhead of *Safety's House*. Tell students that this is Safety's house and that you will all look for what Safety found and decide which items were picked up and put in locked cabinets. Direct the students to look at each room individually. **Ask:** What is in this room that could hurt children? If they do not know, help them out with hints, such as "Look under the sink. What do you see?" If they do not recognize a product, help them out with hints, such as "What do you use to scrub out your bathtub?" When the children say that Safety should pick up an item, put an X over it. You will put an X over the bubble bath and cleanser in the bathroom; in the bedroom, an X over the pills; an X over the furniture polish in the living room; an X on the oven spray and drain opener in the kitchen; and in the garage, an X over the paint, charcoal lighter, motor oil and laundry soap.

Explain what the products do and some of the dangers of the products as you X them out. For example, drain opener unclogs drains, but can burn the skin if touched and the lungs if breathed. Oven sprays clean the oven, but could harm the eyes if sprayed on them. When all of the potentially harmful products are X'ed out, ask students if Safety has made the house safe for the children.
6. Now tell students that they are going to play a game. Tell them that they will get some pictures of things that Safety needed to put away. Safety has two shelves and a locked cabinet to put things in. He wants to use the locked cabinet for things that should be kept out of reach of children. The shelves are for things that children can be around.
7. Pass out the *Products* sheet and the picture of the *Shelves/Cabinet*. Tell students that they can cut out the products and tape or glue them on the appropriate areas. Emphasize that products placed in the locked cabinet are put out of the reach of children because they are potentially harmful.

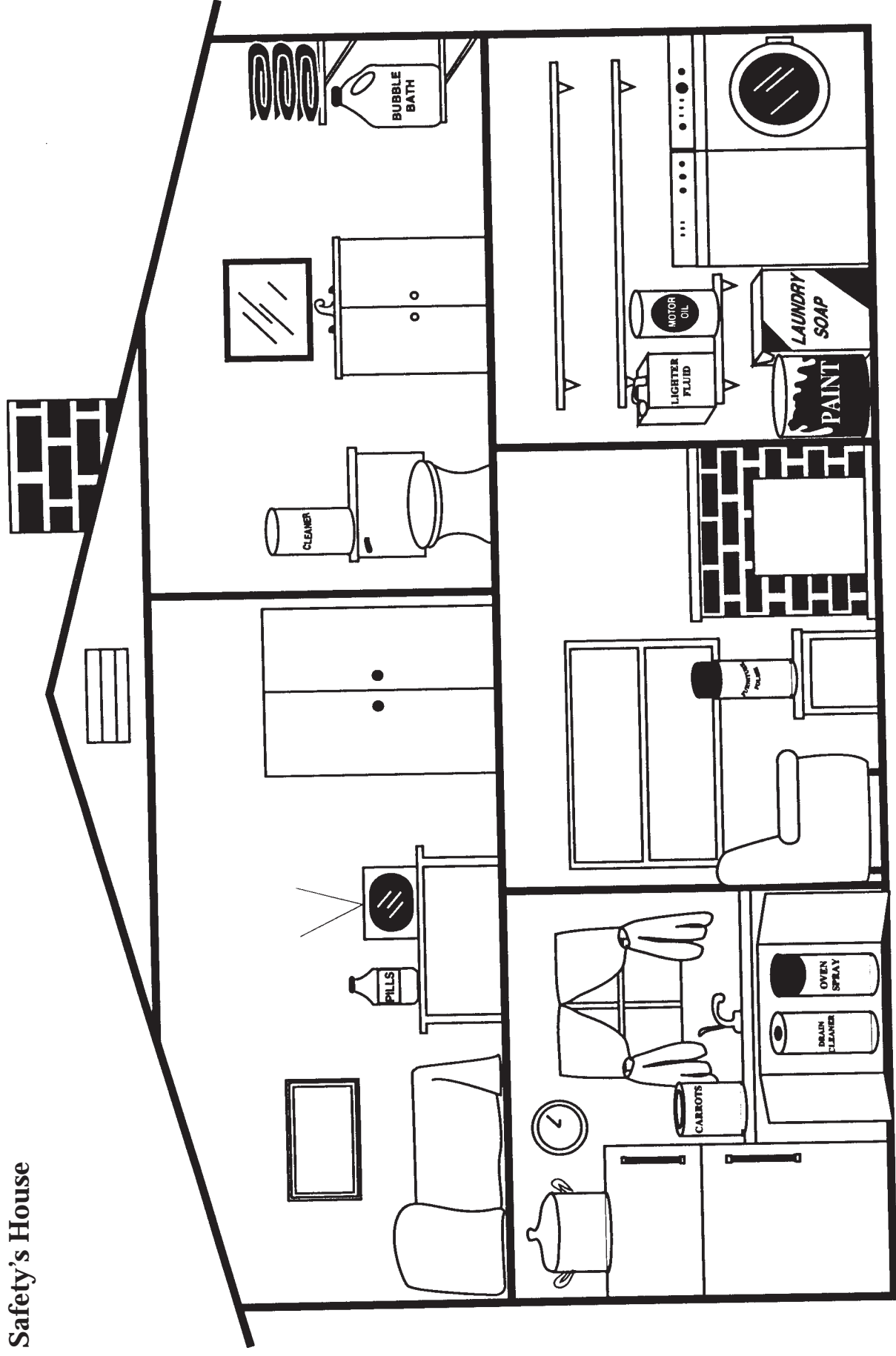
Questions

- What is a hazardous product?
- Name a hazardous product that could be found in each of the following areas of your home: bathroom, bedroom, kitchen, living room, garage.
- Why it is important to stay away from hazardous products?

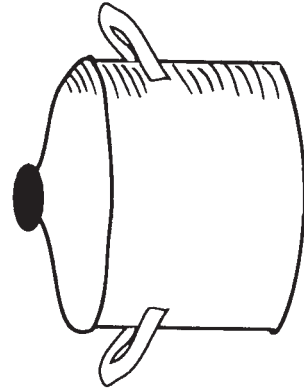
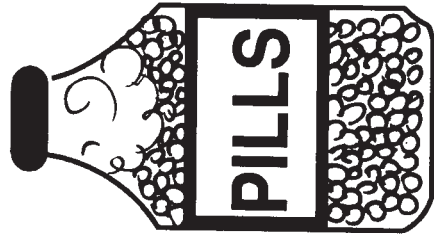
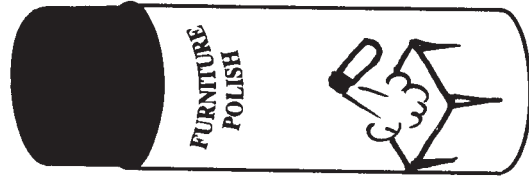
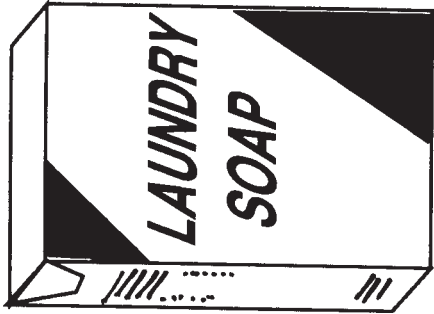
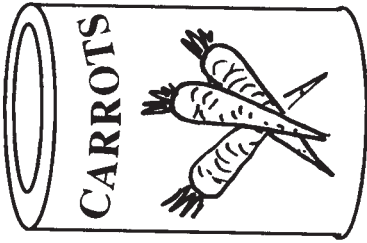
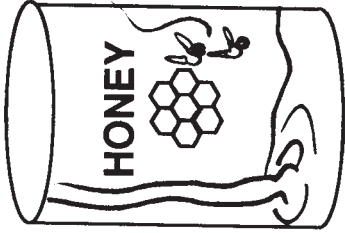
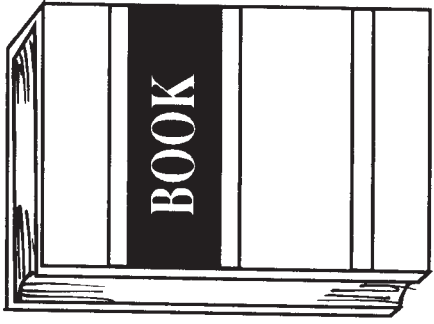
Sources

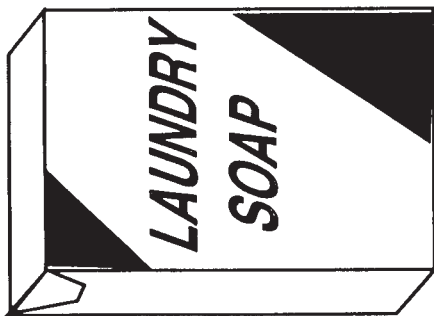
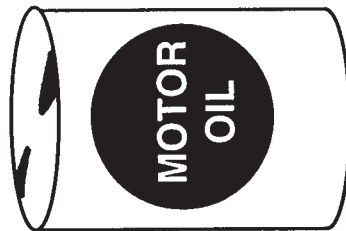
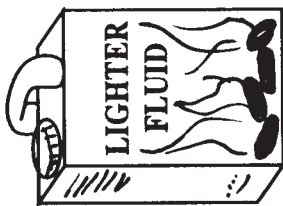
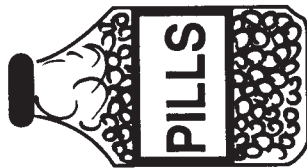
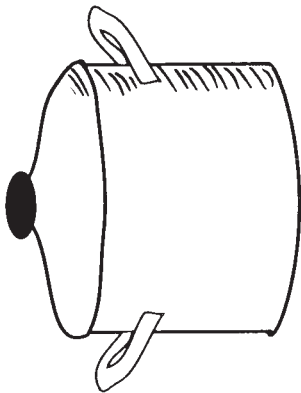
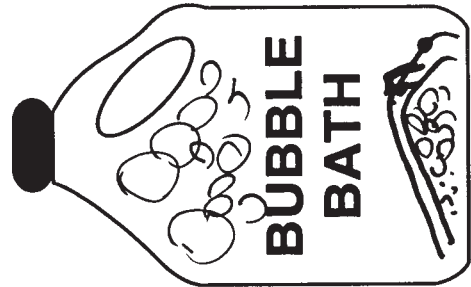
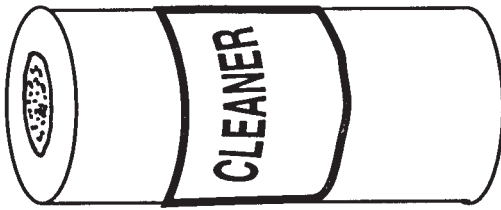
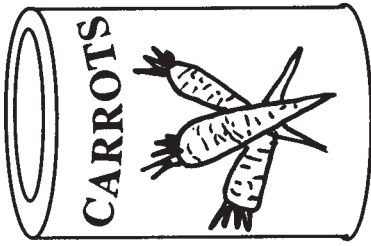
Adapted from *Toxics In My Home? You Bet!* and *No Waste Anthology*

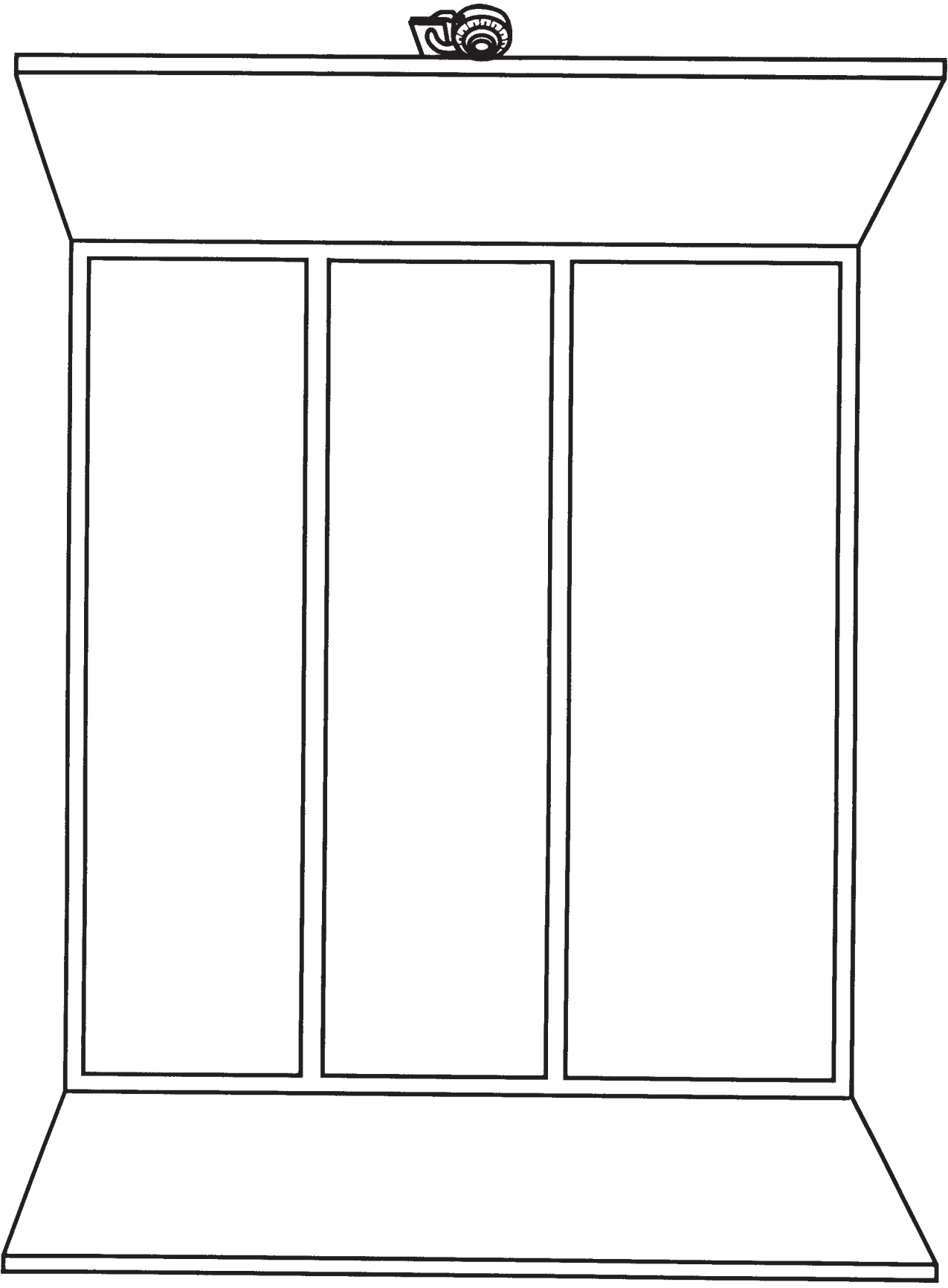
Safety's House



From Toxics in My Home? You Bet!







Routes of Exposure

Rationale

Hazardous substances can enter the body in three ways: through ingestion, inhalation, or skin absorption. Students can protect themselves from accidental exposure to hazardous substances if they understand how these substances can enter their bodies.

Learning Outcome

Students discover how hazardous substances can enter the body by working at learning stations and tracing the routes on human body diagrams.

Teacher Background

Teacher Introductory, pages 4 to 5. We can become ill when our bodies are exposed to household hazardous products through inhalation, ingestion, or skin absorption. Acute health effects from these products are immediate and obvious, such as headaches, dizziness, skin or eye irritation, or nausea. Chronic effects, such as cancer or kidney damage, occur through repeated exposure over a long period of time.

Materials

- Spray bottle filled with water
- Cotton ball soaked in nonhazardous strong scent, such as vinegar or vanilla
- Hand lotion
- Several magnifying glasses
- Paper cups partially filled with water (contents labeled), one per student
- Copies of the *Human Body Diagrams*, one per student
- Colored pencils

Learning Procedure

1. Have students brainstorm for several minutes on all the things that enter their bodies from the environment (examples include food, water, scents, lotions) and write their responses on the board. Then write “nose,” “mouth,” and “skin” on the board. Have students sort the brainstorm list by how things enter the body. Leave the information on the board.
2. Divide the class into small groups and have each group rotate through the following learning stations. (You may want to perform this activity as a class demonstration for younger grades.)

Learning Station 1: Inhalation

Materials: cotton balls soaked with strong nonhazardous scent (vinegar or vanilla)

Tell students to take a whiff of the cotton ball. Ask: What does this cotton ball smell like? What sense are you using? Where did the scent enter your body? Where do you think it went once it entered your body?

Learning Station 2: Absorption

Materials: hand lotion, magnifying glasses

Tell students to take a magnifying glass and look closely at their skin. Next, have them place a *small amount* of lotion on their hands and rub the lotion until it disappears. **Ask:** Where did the lotion enter your body? What does your skin look like? How do you think the lotion went through your skin? Where do you think the lotion went after it went into your skin?

Learning Station 3: Ingestion

Materials: paper cups partially filled with water (contents labeled)

Tell students to take a sip of water from the glass. **Ask:** Where did the water enter your body? Where did the water go after it entered your body?

3. Pass out a copy of the *Human Body Diagrams* to each student. As you read the following description, have students use different colored pencils to trace the route of the substance on the human body diagrams.

When you smelled the (name of scent) on the cotton ball, where did it travel in your body? Find the nose on the first picture and trace where it went. When you sniffed with your nose, the scent was mixed with the air you breathed. Special detectors in the nose helped you to figure out what the scent was. The air you breathed in then traveled down a passageway, called the windpipe. The windpipe goes to the lungs. Once in the lungs, the windpipe divides into two smaller pipes. These pipes keep dividing and get smaller and smaller until they branch into every part of the lungs. At the end of each pipe there are tiny sacs. In these sacs are tiny blood vessels. The air you breathed in with the (name of scents) eventually entered these blood vessels and recharged them. The blood then goes into the left side of the heart. From there it is pumped out to the rest of your body.

When you took a drink of the water, where did it travel in your body? On the second picture, find the mouth and trace where the water went after you drank it. When we eat or drink things, they travel down a long tube, called the esophagus which leads to our stomachs. The stomach acts like a big mixer and breaks things down into small pieces. From the stomach, these things travel into the small intestine. The small intestine is a very long, neatly coiled organ which has millions of tiny finger-like projections, called villi. The villi has millions of blood vessels which take in things, like food and water, from the small intestine. Once things are taken in by the blood vessels, they enter the bloodstream and are carried to all parts of our bodies. Eventually, the blood will enter the lungs to be “recharged.”

When you rubbed the lotion into your hands, where did it travel in your body? On the third picture, find the place which shows the skin and trace where substances go after they enter through the skin. When substances enter through the skin, they may just stay on the outer layer of the skin (for example, lotion) or they may seep down into the second layer of the skin called the inner dermis (for example, gasoline). The inner dermis has millions of small blood vessels in it. Once substances enter these blood vessels, they can travel through the body.

4. From the list made at the beginning of class, have the class categorize all the things that enter their bodies that are good for them and all the things that might make them sick. Have students think of additional things that could be harmful to their bodies. Review the household hazardous products that could make them sick if they ate them, inhaled them or got some on their skin. Explain that the best way to protect themselves from accidentally getting sick is to never touch hazardous products.

Questions

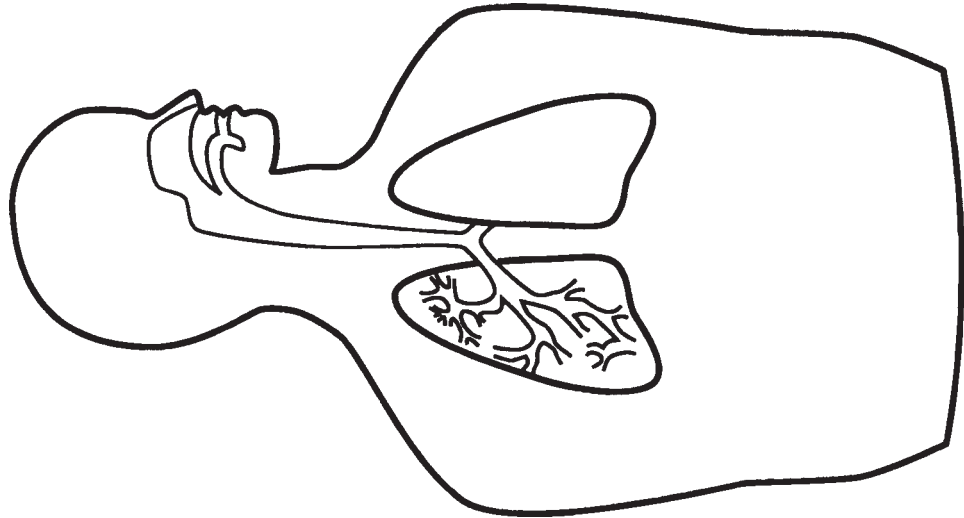
- What are the three ways that substances enter our bodies?
- What can we do to protect ourselves from accidentally getting sick from hazardous products?

Source

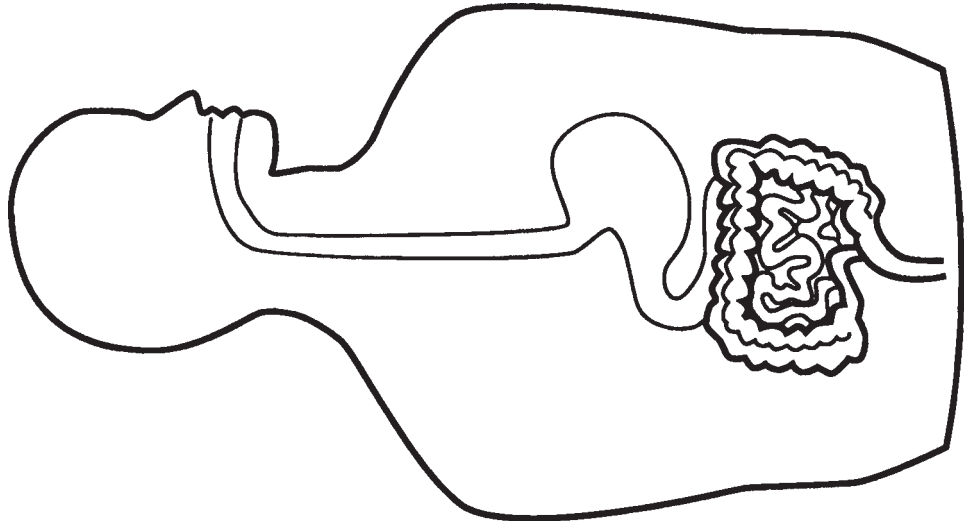
Adapted from *Teaching Toxics*

Human Body Diagrams

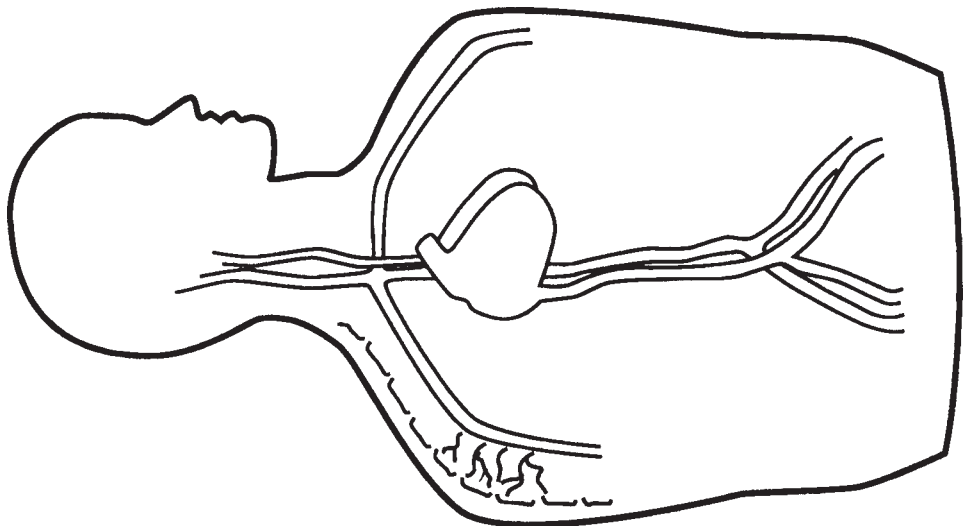
Inhalation



Ingestion



Skin Contact



Household Connections

Rationale

The improper disposal of household hazardous wastes can threaten our health and the environment.

Learning Outcome

Students discover how their homes are connected to the environment by tracing the ways household hazardous wastes enter the environment illustrated on a maze.

Teacher Background

See Teacher Introductory, pages 5 to 8. The improper disposal of household hazardous wastes can pollute our air, water, and soil, and harm plant and animal life. When thrown in the trash, these wastes can leach through the landfill and contaminate groundwater. If they are burned, the air can be contaminated. When poured down the drain, these wastes can destroy sewage treatment systems and leach into groundwater. Dumped into storm drains or ditches, these wastes can flow untreated into rivers, lakes and streams.

Materials

- Copies of *Routes to the Environment* (one per student or a large piece of newsprint to draw mural)
- Copies of *Solution to Household Pollution Maze* (one per student)
- Colored pencils

Learning Procedure

1. Have students draw pictures showing where they think something goes when it is thrown in a garbage can, poured down the drain, dumped on the ground, or burned.
2. Using the *Routes to the Environment* sheet, draw a big mural on newsprint or distribute a copy to each student. Read or have students read each mural scenario. Have students trace on the mural where the hazardous products traveled.

Mural Scenarios

David was cleaning out his garage. There was a lot of old paint that he was never going to use again. He threw the paint in the trash can. Find the trash can and trace where the old paint went.

Alice changed the motor oil in her car. She poured the old oil down the storm drain. Find the storm drain and trace where the motor oil went.

Jack decided to fertilize his lawn. He thought that the more fertilizer he used, the better, so he applied much more than the amount stated on the label directions. It rained the next day and the extra fertilizer washed away. Find the lawn and trace where the extra fertilizer went.

Susan finished painting. After cleaning her paint brushes with cleaner, she poured the paint cleaner down the drain. Find the sink and trace where the paint brush cleaner went.

3. Discuss with the class the information from “Hazardous Products and the Environment” contained in the Teacher Introductory section. Describe the impact on the environment, especially groundwater, from putting hazardous waste in the trash, pouring it into storm drains, dumping it on the ground, and pouring it down the sink.
4. Pass out the *Solutions to Household Pollution Maze*. Read the maze scenarios and have students trace how household pollution can be prevented.

Maze Scenarios

Alice changed the motor oil in her car. She took it to the recycling center where it could then be taken to a factory and cleaned. People can use the cleaned oil again in their cars or to heat buildings. Find the oil container and trace where it went.

David was cleaning out his garage. There were many cans of old paint that he decided he was not going to use again. He took the paint to an event called a “Paint Drop and Swap.” People bring their unwanted paint to this event so that other people who need paint can take the paint home with them. Find the paint can and see where David took the paint.

Jack applied fertilizer to his lawn. He followed label directions and used the correct amount of fertilizer. Because he stopped using too much fertilizer, the water in the pond improved. Find the fish and count how many there are.

(No maze work for this story.) Susan finished painting. She cleaned her brushes in paint cleaner. Susan saved the paint cleaner in a tightly sealed container to reuse the next time she needed to clean her brushes. Susan put the paint cleaner in a labeled container and placed it in a locked cabinet.

5. After completing the maze, ask students to list ways to keep household hazardous wastes from entering the environment. (For example, avoid using hazardous products, recycle, give the product to someone who can use it up, etc.) Write their answers on the board.

Questions

- How can household hazardous products enter the environment?
- What can we do to keep household hazardous products from entering the environment?

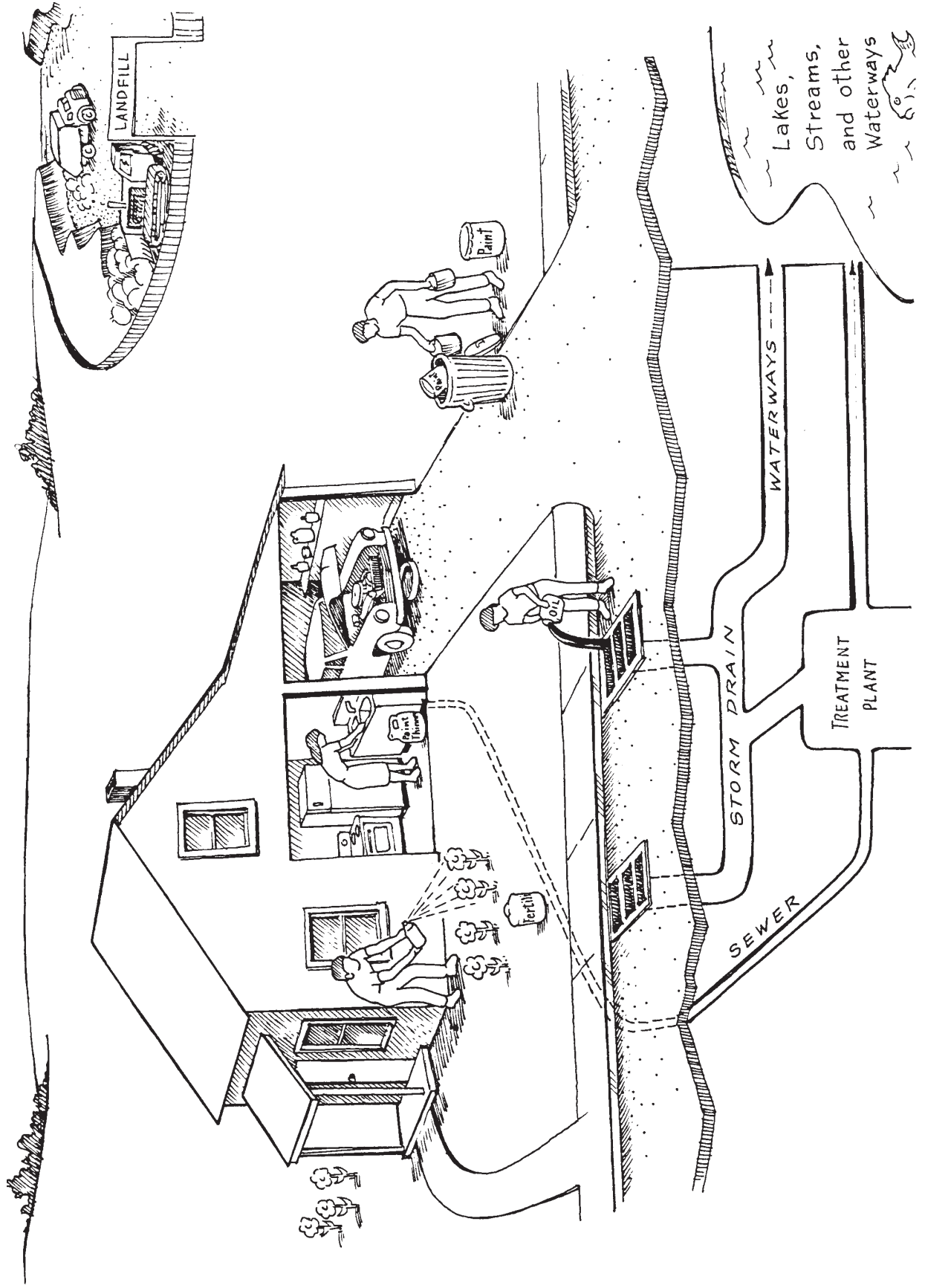
Extended Learning

1. Collect pictures of household hazardous products and of nonhazardous household products. Include materials that can be locally recycled (glass, aluminum, newspaper, etc.). Have students sort the pictures into three piles: Things We Can Recycle; Things Thrown Away; and Things That Are Household Hazardous Waste and need to be treated differently.

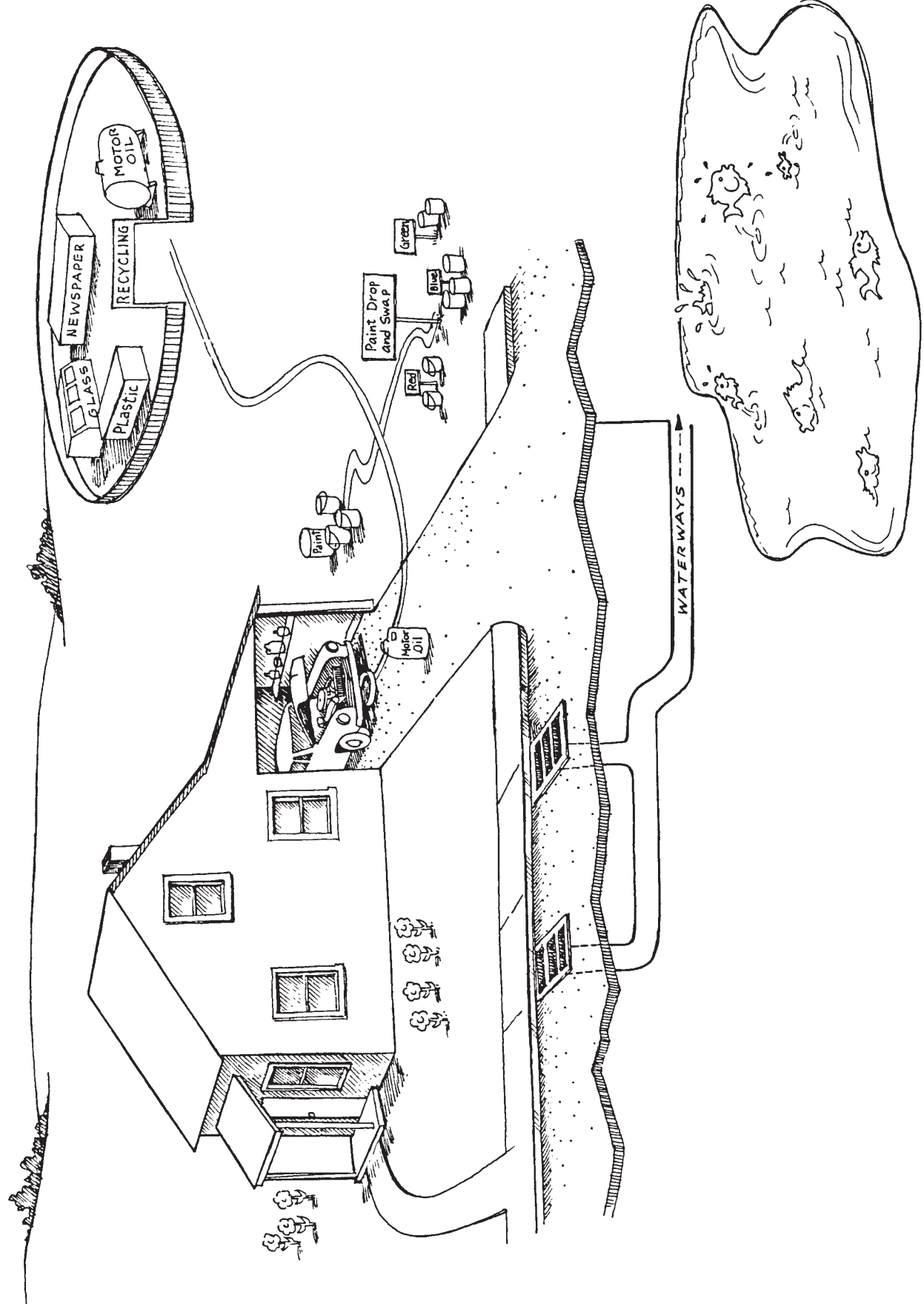
Source

Adapted from *Teaching Toxics*

Routes to the Environment



Solution to Household Pollution Maze



Is There a Safer Alternative?

Rationale

One of the best means of avoiding exposure to household hazardous products is to use safer alternatives whenever possible.

Learning Outcome

Students identify safer alternatives for some household hazardous products and test some of these safer alternatives in the classroom.

Teacher Background

See Teacher Introductory, pages 8 to 10. There are a variety of alternatives to household hazardous products, especially cleaning products. Alternatives include home-made products which are typically less expensive and are easy to make. However, they may require more elbow grease and a more rigorous cleaning schedule to be as effective as commercial products.

Materials

- Sponges
- Empty spray bottles
- Rags
- Ingredients: vinegar or vanilla, cornstarch, baking soda, water
- Recipe cards

Learning Procedure

1. Ask students to name some potentially hazardous products used in the home to clean and freshen the house. List their responses on the board.
2. Explain to students that many potentially hazardous products that we purchase are not always necessary, and are sometimes expensive. There are safer alternatives for some of these products available at most grocery stores. Hold up the vinegar, baking soda and cornstarch. Ask: Where have you seen these products? What are they used for?
3. Explain to students that, although these products are typically used in cooking, they can also be used as ingredients in cleaners. Tell students that they are going to create their own cleaners by following recipes. Discuss measurements and how to follow recipe directions.
4. Divide the class into small groups and assign each group the task of cleaning desks or washing windows. (You may want to do this activity with the whole class for younger grades.) Give each group the appropriate recipe, ingredients, and necessary materials to complete the task.
5. After the groups have finished cleaning, ask each group to report to the class their results of using the safer alternative.

Questions

- What are some advantages of using the safer alternatives?
- Can you think of any disadvantages of using the safer alternatives?

Extended Learning

1. Create advertising for safer alternatives. These can be in the form of posters, essays, or flyers. Display them at school and at home.

Sources

Adapted from *Toxics In My Home? You Bet!* and *Teaching Toxics*

Recipes for Safer Alternatives for Household Hazardous Products**Glass and Window Cleaner**

Mix 1 teaspoon cornstarch, $\frac{1}{4}$ cup white vinegar, and $\frac{1}{2}$ gallon warm water in a spray bottle. Apply to surface and dry with a soft cloth.

Scouring Powder for Desks

Sprinkle baking soda onto a damp sponge. Rub the desk with the damp sponge and rinse with a wet rag.

More Than Meets The Eye

Rationale

Protecting groundwater is important. Groundwater is a vital and irreplaceable source of drinking water in the United States. Fifty percent of Kansans and Missourians depend on groundwater sources for their drinking water.¹

Learning Outcome

Students discover how water is stored in the ground and how difficult, if not impossible, it is to purify groundwater once it is contaminated.

Teacher Background

See Teacher Introductory, pages 6 to 8. Groundwater contamination occurs when water infiltrates into the ground and transports substances to the groundwater zone. Hazardous substances on or under the ground surface may be carried by the movement of water through the soils until they reach groundwater. Large volumes of drinking water can be contaminated by small quantities of certain hazardous substances.

Materials

- One household sponge
- Red food coloring
- Eye dropper
- Clear container to catch water
- Overhead projector
- Overhead of “Water in Soil”

Learning Procedure

1. Tell students that the water they drink and cook their food in may come from underground. **Ask:** Do you think the ground is solid? If it is solid, how can water be stored in the ground?
2. Show students the large sponge. **Ask:** Is this sponge solid? Can it hold water?
3. Set the sponge over a clear container. Pour water over the sponge until it is saturated and the water begins to drip into the container. Empty the container. **Ask:** Is there water in the sponge? If so, where is it?
4. Explain that the water is filling the “air spaces” in the sponge and that the sponge is like the ground. Show the overhead “Water in Soil.” Point out the air spaces available in the soil. Explain that this is how groundwater is stored. Tell students that some soils are better than others at holding water. For example, sandy soils do not hold water as well as clay soils. Special underground areas that hold lots of water are called aquifers.

5. Tell students that the saturated sponge represents an aquifer. Stand the sponge on end. Add one or two drops of red dye onto the saturated sponge. Explain that the dye represents hazardous substances (such as weed and bug killers, gasoline, or oil from leaking tanks) that if improperly disposed of, can contaminate groundwater. Tell students to observe how the “contaminant” begins to dispose throughout the “aquifer.”
6. Squeeze the water from the sponge into the clear container and note its color. Attempt to clean the “aquifer” by resaturating the sponge and resqueezing. Keep track of the number of times necessary to do this before the water becomes completely clear again.

Questions

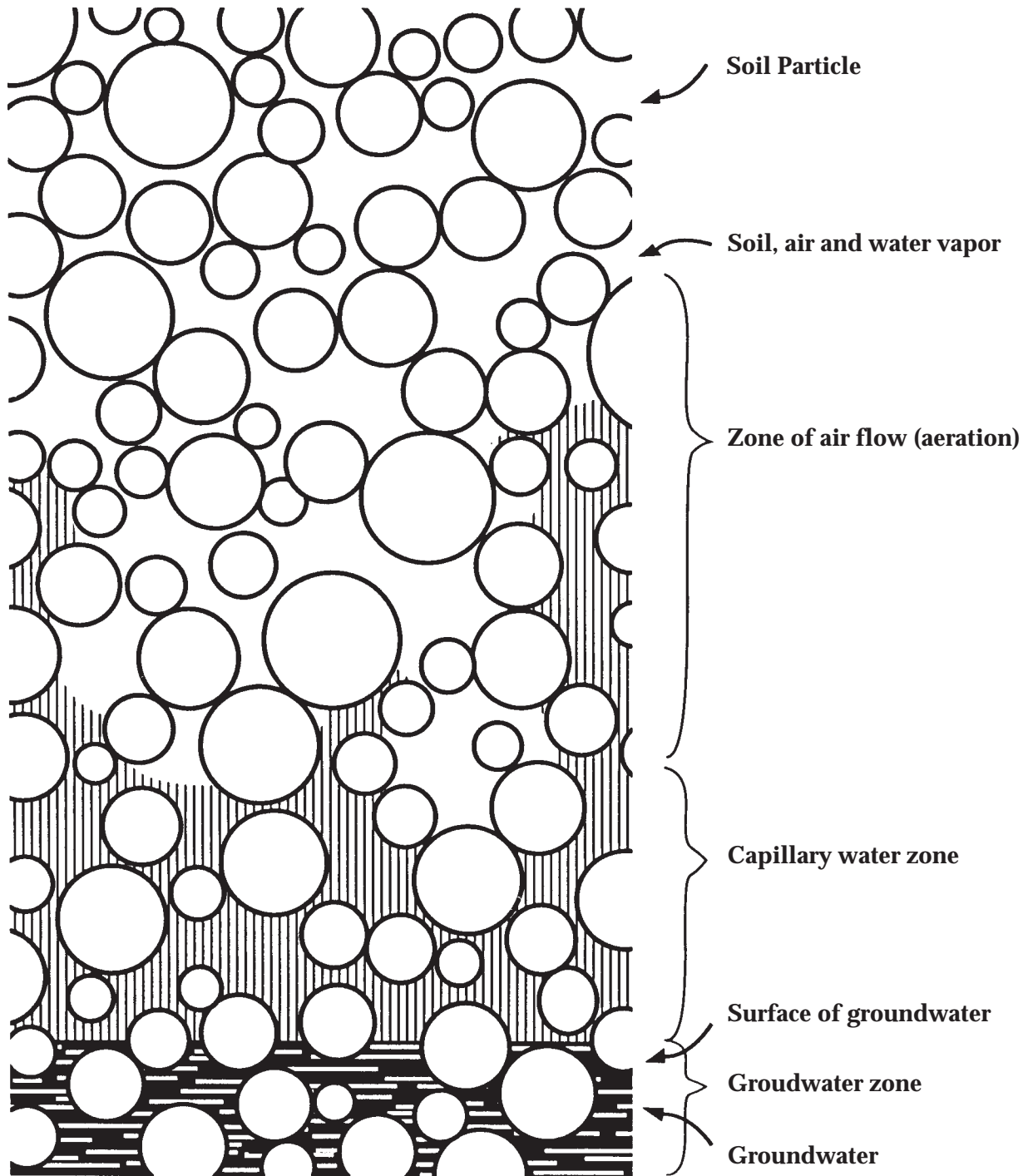
- Where does rain go when it falls on the ground?
- What is groundwater?
- What is an aquifer?
- Where does drinking water come from?
- What does contaminate mean?
- Can you think of any ways these hazardous products might get into groundwater?
- What can we do to keep hazardous products out of our drinking water?

Sources

¹Kansas Water Office, 109 SW 9th St., Suite 300, Topeka, KS 66612 and Department of Natural Resources, P.O. Box 176, Jefferson City, MO 65102.

Adapted from *A-Way With Waste*

Water in Soil



Zunkers classification of soil moisture.

Notes:

Glossary

Acute health effects

Signs and symptoms that result from a single exposure to a hazardous substance, such as headaches, dizziness, skin or eye irritation, vomiting, coma, or death. Symptoms usually occur shortly after exposure and may range from minor to severe.

Aquifer

An underground geological formation in which the cracks in rock, sand, or gravel are filled with water.

Bioaccumulation

The process by which the biological concentration of a substance is increased through links in the food chain. A number of smaller organisms that are contaminated are eaten by larger ones. The larger ones are eaten by an even larger one, etc. The further along the food chain, the greater the concentration. A substance that shows no effect in a small concentration could be very injurious or fatal when concentrated in the predator.

Carcinogen

Capable of producing cancers in humans and animals.

Chronic health effects

These effects are gradual and occur through repeated exposure to hazardous substances over an extended period of time. Examples include cancer, liver or kidney damage, birth defects, or central nervous system damage.

Combustible

Any substance that will burn. Usually refers to solids that are relatively difficult to ignite and to liquids that have a flash point at or greater than 100°F but below 200°F.

Corrosive

Any substance that can burn and destroy living tissues, or which causes a severe corrosion rate in steel or aluminum.

EPA

The Environmental Protection Agency, the federal agency responsible for the enforcement of all federal regulations having to do with air and water pollution, radiation and pesticide hazard, conservation, ecological research and solid waste disposal.

Flammable

Any substance that can be easily set on fire. Flammable liquids have a flash point less than 100°F.

Flash point

The minimum temperature at which a liquid or solid gives off sufficient vapor to form an ignitable vapor-air mixture near the surface of the liquid or solid as determined by a specified method.

Groundwater

Water beneath the earth's surface at varying depths.

Hazardous materials

Chemicals that pose a significant threat to human health and/or the environment.

Hazardous waste landfill

A landfill designed to accept hazardous waste.

Household hazardous product

A product, which is corrosive, reactive, flammable, or toxic, purchased by an individual for private use.

Household hazardous waste collection

A one-time event or ongoing community program to collect and provide proper disposal for unwanted or unusable household hazardous products.

Ignitable

Solids that catch fire easily and burn so rapidly that they create a serious health hazard, and liquids that have a flash point less than 140°F.

Irritant

Any substance which inflames living tissue by chemical action at the site of contact, causing pain or swelling.

Landfill

Facility in which solid waste from municipal and/or industrial sources is disposed; sanitary landfills are those landfills that are operated in accordance with current environmental protection standards.

Leachate

The liquid forming when water infiltrates through the soil covering a landfill and percolates through the waste, picking up a variety of suspended and dissolved materials from the waste.

Municipal sewer system

A type of sewage system in which underground pipes collect wastes from residences, office buildings, businesses, and schools that eventually drain into a wastewater treatment plant. The degree of treatment depends on the type of system. After treatment, the effluent is discharged into lakes, streams, or rivers.

Mutagen

A substance which alters the genetic structure of a cell, especially reproductive cells.

Organic solvent

A dissolving medium comprised of compounds of carbon, except for certain rocklike or earthy carbon-containing substances that are usually classified as inorganic compounds such as calcium carbonate, carbon dioxide, carbon monoxide, and cyanides.

Persistent material

A material that degrades very slowly, if at all.

Polychlorinated biphenyls (PCBs)

A mixture of chemicals that are clear to yellow oily liquids or solids. They have been used in insulating fluids of electrical systems. PCBs are suspected carcinogens.

Reactive

Any substance which can cause an explosion when subject to heat, sudden shock, pressure or contact with an incompatible substance.

Recycle

To separate a given waste material from other wastes and to process it so that it can be used again in a form similar to its original use.

Reduction

The process of decreasing the amount of waste generated at each step of product development or use.

Septic system

A type of sewage system in which the solid materials settle out in a septic tank and are gradually broken down by bacteria. The liquid sewage flows out into the drainfield or lagoon where, ideally, it is broken down by soil bacteria. Most often, a septic system serves an individual home.

Solvent

A material that can dissolve other materials to form a uniform single-phase mixture. Water is a common solvent.

Storm drains

Systems of ditches, culverts or underground pipes that collect storm water runoff from impervious urban surfaces, such as streets, roofs, driveways and parking lots. Usually, the pipes empty the untreated water directly into lakes and rivers.

Teratogen

A substance that produces a physical defect in a developing fetus.

Toxic

Any substance that can cause injury or death if eaten, inhaled or absorbed through skin.

Volatilization

Loss of a substance through evaporation.

Waste water treatment plant

A facility that receives wastewaters (and sometimes storm drain runoff) from domestic and/or industrial sources, and by combination of physical, chemical, and biological processes reduces (treats) the wastewaters to less harmful byproducts. After treatment, the effluent is discharged into lakes, streams, or rivers and solids (sludge) are dried and applied to nonagricultural lands.

Notes:

Resources

Environment

50 Simple Things You Can Do to Save the Earth (1989), by Earthworks Group, published by the Earthworks Group, Berkeley, CA.

The Amicus Journal, published quarterly by the National Resources Defense Council, 122 East 42nd St, Room 4500, New York, NY 10168.

Buzzworm: The Environmental Journal, published bimonthly by Buzzworm, Inc., 2305 Canyon Blvd, Suite 206, Boulder, CO 80302, 800-825-0061.

E Magazine, published monthly by Earth Action Network, Inc., 28 Knight St, Norwalk, CT 06851, 203-854-5559.

Environmental Action, published bimonthly by Environmental Action, Inc., 1525 New Hampshire Ave NW, Washington, DC 20036, 202-745 4870.

Worldwatch, published bimonthly by the Worldwatch Institute, 1776 Massachusetts Ave NW, Washington, DC 20036.

Health

Children's Art Supplies Can be Toxic, by Angela Babin, Perri A. Peltz, and Monona Rossol. This fact sheet is available from Center for Safety in the Arts, 5 Beekman St, New York, NY 10038, 212-227 6220.

Hazardous Substance Fact Sheets, prepared and available from the Right to Know Program, New Jersey Department of Health, CN 368, Trenton, NJ 08625-0368, 609-9842202. They have health and safety information for hundreds of chemicals, many of which are found in consumer products.

Health and Environmental Digest, published monthly by Freshwater Digest, 2500 Shadywood Rd. P.O. Box 90, Navarre, MN 55392-0090.

An Introduction to Toxic Substances, *Glossary of Environmental Health Terms*, *A Guide to Reference Materials on Toxic Substance*, and *Who to Contact for Help and Information About Environmental Health* are booklets available from the New York State Department of Health, Center for Environmental Health, 2 University Place, Albany, NY 12203-3399, 800-458-1158.

Household Hazardous Materials

Cleaning Up Toxics at Home (1990), produced by The Video Project, 5332 College Ave. Suite 101, Oakland, CA 94618, 415-655-9050, for the California League of Women Voters. This is an excellent 25-minute video.

Common Sense Pest Control Quarterly is available from the Bio Integral Resource Center, P.O. Box 7414, Berkeley, CA 94707.

Guide to Hazardous Products Around the Home (1989), by the Household Hazardous Waste Project, 1031 E. Battlefield, Suite 214, Springfield, MO 65807.

Household Hazardous Waste Wheel (1988) and *Home Inventory: Your Guide to Responsible Care of Hazardous Household Products* (1993) are available from Environmental Hazards Management Institute, P.O. Box 283, 137 High Street, Portsmouth, NH 03801, 603-436-3950.

Household Product Disposal Guide (MF-965), K-State Research and Extension, Manhattan, KS 66506, 785-532-5830.

Journal of Pesticide Reform is a quarterly publication of the Northwest Coalition for Alternatives to Pesticides, P.O. Box 1393, Eugene, OR 97440, 503-344-5044. This magazine provides information on pesticide use and abuse.

Pesticides and You is available from the National Coalition Against the Misuse of Pesticides (NCAMP), 530 Seventh Street S.E., Washington, DC 20003, 202-543-5450. The newsletter addresses the use and misuse of pesticides.

Series of brochures available from the Kansas Department of Health and Environment, Office of Health and Environmental Education, Attn: J. Ransom, Landon State Office Building, 900 SW Jackson, Topeka, KS 66612-1290, 785-296-1226:

Automotive Products

Paints and Solvents

Using Household Products Falsely

Using Pesticides Safely

Series of guide sheets available from the Household Hazardous Waste Project, 1031 E. Battlefield, Suite 214, Springfield, MO 65807:

Safe Use, Storage and Disposal of Pesticides (WM6000)

Safe Use, Storage and Disposal of Paint (WM6001)

Selecting Household Safety Equipment (WM6002)

Household Hazardous Products (WM6003)

Material Safety Data Sheets (WM6004)

Store Hazardous Products Safely (WM6005)

Contact HHWP for information on costs and availability.

Safer Products

Clean and Green (1990), by Annie Berthold-Bond, published by Ceres Press, Woodstock, NY.

The Green Consumer (1990), by John Elkington, Julia Hailes, and Joel Makower, published by Penguin Books, New York, NY.

The Green Consumer Letter, (Joel Makower, Editor). A monthly newsletter published by Tilden Press, 1526 Connecticut Ave NW, Washington, DC 20036, 202-332-1700 or 800-955-GREEN.

Guide to Hazardous Products Around the Home (1989), by the Household Hazardous Waste Project, 1031 E. Battlefield, Suite 214, Springfield, MO 65807.

The Healthy Home: An attic-to-basement guide to toxin-free living (1989), by Linda Mason Hunter, published by Rodale Press, Emmaus, PA.

The Nontoxic Home and Office: Protecting Yourself and Your Family from Everyday Toxics and Health Hazards (1992) by Debra Lynn Dadd published by Jeremy P. Tarcher, Inc., Los Angeles, CA.

Nontoxic, Natural, and Earthwise (1990), by Debra Lynn Dadd, published by St. Martin's Press, New York, NY.

Youth Involvement and Protection

A-Way With Waste: A Waste Management Curriculum for Schools, Washington State Department of Ecology, 3190 160 Avenue SE, Bellevue, WA 98008, 206-649-7043.

Environmental Hazards in Your School: A Resource Handbook (1990), publication number 2DT-2001 from the U.S. EPA (TS-799), Washington, DC 20460.

50 Simple Things Kids Can Do to Save the Earth (1990), by the Earthworks Group, published by Andrews and McMeel, Kansas City, MO.

Healthy Homes, Healthy Kids: Protecting Your Children From Everyday Environmental Hazards (1991), by Joyce Schoemaker and Charity Vitale, published by Island Press, Washington, DC.

Pest Control In Schools: Adopting Integrated Pest Management (1992), U.S. EPA Office of Pesticide Programs. Order from the Public Information Center, U.S. EPA, Washington, DC 20460.

School Pesticide Use Reduction (SPUR) Guide: Working Together for Pesticide-Free Schools (1991), by Sharon Taylor and published by the Environmental Health Coalition, 1717 Kettner Blvd, #100, San Diego, CA 92101-2532, 619-235-0281.

Teaching Toxics: Creating Solutions to Household Pollution, Association of Vermont Recyclers, P.O. Box 1244, Montpelier, VT 05601, 802-229-1833.

The No Waste Anthology, California Department of Toxic Substances Control, Education and Information Unit, 400 P Street, Sacramento, CA 95814, 916-322-0476.

Tools for the Environmental Teacher (1991, #WM5003), by the Household Hazardous Waste Project and the California Department of Toxic Substances Control. This is an annotated bibliography of household hazardous waste educational materials and curricula from the United States and Canada for K through 12. Available from HHWP, 1031 E. Battlefield, Suite 214, Springfield, MO 65807.

Toxics in My Home? You Bet!, Golden Empire Health Planning Center. Distributed by Local Government Commission, Inc., 909 12th Street, Suite 205, Sacramento, CA 95814, 916-448-1198.

Sources

Materials adapted with permission from:

A-Way With Waste: A Waste Management Curriculum for Schools, Washington State Department of Ecology, 3190 160 Avenue SE, Bellevue, WA 98008, 206-649-7043.

Home Hazardous Product Survey and What Your Home Haz, Household Hazardous Waste Project, 1031 E. Battlefield, Suite 214, Springfield, MO 65807, 417-889-5000.

SLEUTH: Strategies and Lessons to Eliminate Unused Toxicants. Help!, METRO, Water Resources Section, HHW Project, 103 Nickerson Street, Suite 100, Seattle, WA 98109, 206-689-3050.

Teaching Toxics: Creating Solutions to Household Pollution, Association of Vermont Recyclers, P.O. Box 1244, Montpelier, VT 05601, 802-229-1833.

The No Waste Anthology, California Department of Toxic Substances Control, Education and Information Unit, 400 P Street, Sacramento, CA 95814, 916-322-0476.

Toxics in My Home? You Bet!, Golden Empire Health Planning Center. Distributed by Local Government Commission, Inc., 909 12th Street, Suite 205, Sacramento, CA 95814, 916-448-1198.

Kansas Contacts

Kansas Department of Health and Environment
Bureau of Waste Management
Household Hazardous Waste Program
Building 740 Forbes Field
Topeka, KS 66620
785-296-1600

Kansas Department of Health and Environment
Office of Health and Environmental Education
Landon State Office Building
900 SW Jackson
Topeka, KS 66612-1290
785-296-1226

Kansas State University
Research and Extension
Manhattan, KS 66506-3400
785-532-5820

Kansas Water Office
109 SW 9th St., Suite 300
Topeka, KS 66612-1249
785-296-3185

Mid-America Poison Control Center
University of Kansas Medical Center
3901 Rainbow Blvd., Room B400
Kansas City, KS 66160-7231
800-332-6633

For information on household hazardous waste collections in your area, contact your Kansas Department of Health and Environment.

District Offices:
Northeast District
800 West 24th St.
Lawrence, KS 66046
785-842-4600

North Central District
2501 MarketPlace, Suite D
Salina, KS 67401
785-827-9639

Northwest District
2301 E. 13th St.
Hays, KS 67601-2651
785-625-5663

Southwest District
302 West McArtor
Dodge City, KS 67801-6098
316-225-0596

South Central District
130 South Market
Wichita, KS 67202-3802
316-337-6021

Southeast District
1500 West 7th
Chanute, KS 66720
316-431-2390

Notes:

The Household Hazardous Waste enrichment program is a product of the work of the 4-H Solid Waste Subcommittee. We gratefully acknowledge the assistance of these committee members:

Mike Bradshaw
Patricia Marvin
C.R. Salmon

A sincere thanks goes to Richard Gardner and Mike Dorcey of the Kansas Extension Energy Service for their graphic design and editorial assistance.

Compiled by:

Joan Twiton
Household Hazardous Waste Project
Suite 214, 1031 East Battlefield
Springfield, Missouri 65807

Michelle Feenstra
Extension Specialist, Industrial Pollution Prevention
133 Ward Hall
Kansas State University
Manhattan, Kansas 66506

This publication and other publications from Kansas State University are available on the World Wide Web at:
<http://www.oznet.ksu.edu>

Contents of this publication may be freely reproduced for educational purposes. All other rights reserved. In each case, credit Kansas 4-H; Lessons in Solid Waste Management for Teachers Grades K-3; Kansas State University; September 1997.

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

4-H 602

August 1993

Issued in furtherance of Cooperative Extension Work, acts of May 8 and June 30, 1914, as amended. Kansas State University, County Extension Councils, Extension Districts, and U.S. Department of Agriculture cooperating. Richard D. Wootton, Associate Director. All educational programs and materials available without discrimination on the basis of race, color, religion, national origin, sex, age, or disability.

File Code: 4-H and Youth Programs—2

8-93—1M; 9-97—3M